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ABSTRACT

A 3-year Title III project in Union, New Jersey involved screening of 869 incoming kindergarten children in 1967 and 840 children in 1968, subsequent identification of children's perceptual difficulties, and remediation. The children were screened in areas of perceptual-motor match, auditory dynamics, associative processes, and gross-motor coordination. Data on socioeconomic background, birth, and developmental history were collected through parent interviews and a questionnaire. Children who received scores in the lowest 5% of one or more developmental areas or whose total score was in the lowest 10% bracket were selected for intensive training from the 1967 class. The same selection procedure was used for the 1968 class; through children in the lowest 20% level were included. First year children received training through diagnostic teaching for 1/2 hour of perceptual activities four days per week. Also, the perception teachers worked with each kindergarten class 1 day per week and were observed by kindergarten teachers. During the second year only experimental groups were given intensive training. Four research studies were conducted during each year. First year project results indicated that a significant mean difference existed between pretest and posttest results for the 172 experimental children receiving intensive training as compared with 500 children receiving an enrichment program only. Comparison of pretest and posttest results for both the 1967 and 1968 classes indicated that the intensive training was most effective in areas of visual-motor integration, and in certain aspects of gross-motor development. (MC)

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FINAL REPORT

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A PROGRAM FOR THE IDENTIFICATION AND REMEDIATION OF PERCEPTUAL DEFICIENCIES IN KINDERGARTEN AND PRIMARY GRADE STUDENTS

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A PROGRAM FOR THE IDENTIFICATION AND REMEDIATION OF PERCEPTUAL DEFICIENCIES IN KINDERGARTEN AND PRIMARY GRADE STUDENTS

FINAL INTERIM PROGRESS REPORT

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Project Director

Title III Grant No. OEG. 3-7-703564-4312

Grantee: Union Township Board of Education
Union, New Jersey 07083
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MAY, 1971

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SUMMARY

The purpose of this three year operational grant was to provide early identification and remediation of perceptual deficiencies in order to prevent or minimize learning disabilities.

The program became operational during the summer of 1967, at which time all incoming kindergarten children in Union were screened in order to identify youngsters manifesting a developmental lag, as indicated by a selected battery of tests. Included in the screening were all public school children as well as those expected to attend parochial schools and the Campus School of Newark State College, Union, New Jersey. Incoming kindergarten youngsters in a neighboring community were also tested in order to establish a control population. The total number of children screened was 869. During the summer of 1968 the same procedure was used to test the 840 incoming kindergarten children of that year.

Screening

The children were tested in four general areas of development:

A. Perceptual-Motor Match.

B. Auditory Dynamics (auditory and rhythmic sequencing)

C. Associative Processes.

D. Gross-Motor Orientation.

The evaluative techniques used to assess each of these areas are as follows:

A. Perceptual-Motor Match.

1. Simkov Perceptual Organization Inventory

2. Four Geometric Designs
   1. +
   2. X
   3. ⊞
   4. ⊠

3. Goodenough-Harris Draw-A-Man

B. Auditory Dynamics

1. Auditory Vocal Sequencing Test. (The Illinois Test of Psycholinguistic Abilities (ITPA)
2. The Padalino Clapping Patterns

C. Associative Processes
Auditory Vocal Association Test. (ITPA)

D. Gross Motor Orientation - Purdue Perceptual Motor Survey

1. Walking Board: Forwards, (F), Backwards (B), Sidewards (S)
2. Body Identification
3. Kraus-Weber
4. Angels-in-the-Snow

The four scores in these individual areas (A,B,C,D) were then averaged to yield T, a total score for each child. Data relevant to the socio-economic background, birth, and development history of each child were obtained from a parent interview and questionnaire.

Selected for intensive training, from the kindergarten class of 1967, were those children who received scores in the lowest 5% in any one or more of the developmental areas (A,B,C,D) or whose total score fell in the lowest 10%. In the kindergarten class of 1968, some children were included in training groups whose scores in one or more of the areas were within the lowest 20%.

Training Procedures

During the first year of the project children selected for intensive training were taken out of class, four days a week, in groups of six, for one-half hour of perceptual activities. One day per week the perception teachers worked with each kindergarten class so that all children received an enrichment program. This also provided an opportunity for the kindergarten teachers to observe the training techniques so that they could reinforce them. After the first year, however, the perception teachers worked with the children in the experimental groups five days per week. The rest of the children received training only to the extent that it was provided by the kindergarten teacher.

The program was an eclectic one, utilizing ideas suggested by some of the foremost educators and psychologists in the field of learning disabilities, e.g. Cruickshank (1961), Kephart (1964), Johnson and Myklebust (1967), Barsch (1963) et. al. Innovative techniques evolving from weekly workshops were also included in the training procedures.

The basic philosophy was that of diagnostic teaching, with emphasis on reinforcement of areas of strength concomitant with attempted improvement of deficit areas. An intramodality, multi-modality approach was used, depending upon the needs of the children.

Also included in the program were many techniques involving the higher cognitive faculties e.g. categorizing, associative processes, and concept formation, so that the objective encompassed more than training in sensory modalities. Attempts were made to teach each child to focus his attention, to problem solve and to become self directed.

Research Design

Ideally, it would be desirable to investigate the effects of training on children separated into groups based on deficit area(s). This would have resulted in 31 groups, five with deficits in a single area, 10 with deficits in two areas, 10 in three areas, five in four areas, and one in all five. With the number of subjects available in the Union and control school systems, this was impossible. Since it was believed that the deficit(s) and relative strengths of the individual might affect his response to training, it was decided to use a matched pair approach.

Accordingly, experimental and control groups were established. Thus, as previously stated, at the same time the Union children were tested, youngsters in a neighboring community were screened with the same instruments. Pairs of children were matched on eight variables: sex, age, scores (A, B, C, D and T) and profile of scores. In addition to comparing the average performances of the total populations (500 in Union with 77 in neighboring community), studies were made of the following groups of matched pairs from the kindergarten class of 1967:

1. Twenty-eight children receiving training in Union with 28 children receiving no training in a neighboring community. These were all identified as having problems in one or more areas.

2. A sampling of 31 Union children who did not perform poorly on the screening instruments but who participated in an enrichment program with 31 children in a neighboring community receiving no training.

3. Twenty-six children in Union receiving training with 26 children in Union receiving training in all the modalities except gross-motor.

4. Twenty-four children in Union receiving training with 24 children in Union receiving only the enrichment program. This latter group was not included in the training program because the children scored just above the cut-off scores.

CHILDREN ENTERING KINDERGARTEN AND TESTED DURING THE SUMMER OF 1968

1. Twenty-four children in Union receiving training with 24 children in a neighboring community receiving no training.

2. A sampling of 32 children in Union receiving no training with 32 children in a neighboring community receiving no training.

3. Twenty children in Union receiving training with 20 children in a neighboring community who were exposed to unstructured kindergarten activities in groups of six, one-half hour per day. This was an attempt to determine if there was a Hawthorne Effect.

4. Twenty-one children receiving training with 21 Union children receiving no training.

Results of the Evaluation

At the end of the first year of the project, the mean difference between pre and post test results of the total composit score (average of Scores A, B, C, and D) for the 172 Union children receiving intensive training compared with 500 Union children receiving an enrichment program was extremely significant, yielding a "t" statistic of 9.16.

A comparison was also made of the mean growth on the ten subtests for the groups of matched pairs. This was done at the end of each year of the project for both kindergarten classes, i.e. the class of 1967 and the class of 1968.

In both classes, the comparison of pre and post tests indicates that the training was most effective in the areas of visual-motor integration and in certain aspects of gross motor development, particularly in awareness of body parts. There were also sporadic indications of significant improvement in associative processes and in sequencing. Intertest correlations run on the pre and post tests of the first year of the project suggest that training during that year was effective in equalizing the uneven developmental patterns of kindergarten children so as to fill in developmental gaps.

It was unfortunate that the Hawthorne Experimental and Control Groups could not be maintained beyond the kindergarten year. The test-retest results after the one year during which it was in operation suggest that the training per se is more important than "attention" in bringing about significant improvement in the areas tested. However, the importance of the attention factor should not be overlooked.

The test results also suggest that there is carry over from this type of training to the academic subjects. There was a sufficient number of tests significant at the .05 level in favor of the experimental groups to suggest that the training was effective, especially in the areas of visual-motor integration and in certain aspects of gross motor development, particularly awareness of body parts. There were also indications of improvement in concepts and in sequencing.

Dissemination of Information

An outgrowth of the program has been the dissemination of information throughout the country and abroad by means of lectures to professional and lay groups, participation in conventions, and orientation programs for visitors. A curriculum guide and a library of video tapes have been prepared and are available.

CONTEXT

The Locale

Located in the Greater Newark, New Jersey Metropolitan area, Union Township is a community of some 55,000 residents or approximately one per cent of New Jersey's six million inhabitants.

It is a suburban area of mostly private homes with a favorable balance of light industry, commerce and business establishments. The majority of residents may be classified as skilled or semi-skilled workers, service workers and, to a lesser degree, professional and business executives. Many persons travel to business in Newark, Elizabeth, or New York City.

The School System

Union Public Schools are organized on an elementary (K-5), Central-Six, junior high, and senior high plan.

The educational program services nearly 8,800 students in kindergarten through the twelfth grade. Approximately half of Union's graduates further their education while industry and business absorb the remainder.

The Union Township Schools have offered education leadership in the county and state for many years. Building on a good basic program for all students, Union has pioneered in efforts to challenge the academically talented and the below average achiever. Special offerings for the academically talented have been operated in Union for over a decade and now include students from grades seven through twelve.

This proposal was made under the direction of the Student Personnel Services Department which was first organized in 1929. It now directs programs for educable trainable emotionally disturbed socially maladjusted and neurologically impaired children. A staff of over sixty provide all pupil personnel services including speech, reading, guidance, home instructions, supplementary instruction and social service. Four psychologists, ten learning disability specialists, a social worker, medical

specialists, and a child psychiatrist compose the Child Study Team in the district.

Average per pupil annual expenditure for 1968-1969 was $887.29.

Needs Assessment

Over a period of many years it became apparent that many youngsters who were not achieving their academic potential manifested perceptual deficits. This was made evident as a result of psychological, psychiatric and neurological evaluations. For the most part, by the time the children were referred for testing and evaluated, they had already developed emotional problems. An attempt was made to remediate their perceptual or developmental deficiencies by the professional staff and through parent orientation programs. However, it soon became apparent that the perceptual problems were being identified rather late, since the height of perceptual development takes place between 3½ and 7 years of age. Moreover, the school system was not adequately staffed for an early identification-remediation program and the parents, although impressed with the importance of remediation, did not consistently follow-through with home training.

Consequently, during the academic year of 1966-67 the Department of Student Personnel applied for and received $10,000 in a planning grant, which provided the funds for adequate preparation for the $300,000 three-year operational grant which was to follow. Preparation involved consultation, and or study with such prominent educators as Dr. Newell Kephart, Mrs. Elizabeth Freidus, Drs. Ilg and Ames.

A pilot study was also operated during this period of time in order to make a determination regarding staff, screening instruments, testing schedules, training techniques, and teacher-parent orientation.

PROGRAM DESCRIPTION

Scope of the Program

Statement of Purpose

The human being is a complex organism, having the capacity to adapt to, function within, and, in many ways, control a constantly changing environment. He accomplishes this through a sequential learning process requiring sensory-motor experiences, thus permitting the individual to react to, assimilate, and interpret information about his external environment. Thus, learning starts at birth, (if not in utero) and is a continuous, dynamic process. It occurs, for example, when the infant feels comfort or discomfort, when he moves or immobilizes different parts of his body,

when he tastes food or smells aromas, when he is exposed to various kinds and intensities of sound, when he sees light and shadows.

The opportunity for learning is increased when the child can maneuver about. In this way, he is learning to coordinate different parts of his body more efficiently; he learns to judge distances and space, size and proportions, balance and counterbalance, direction and counterdirection. Indeed, he develops percepts and concepts by tasting, smelling, feeling, weighing (heft), manipulating, maneuvering, listening and seeing - i.e., by responding to environmental stimuli, whether they be animate or inanimate objects. Thus, much of learning in the formative years is experiential, adaptive and sequential.

Moreover, this early sensory-motor stage of the child's development affects not only his intellectual processes and potential but also his personality development, for the infant's earliest form of social communication is through motor expression (crying, gestures, etc.)

It is assumed that when a child is chronologically six years of age, he is ready for structured, formal, learning programsheavily weighted in symbolic language. It isn't until some youngsters manifest learning problems, however, they are identified as "not ready" for that level of academic achievement. Some children experience difficulties because of neurological impairment, mental retardation, emotional involvement, physical handicaps or any combination of these factors. It appears that others seem to have had inadequate experiential learning in their preschool years, so that they lack the perceptual orientation for symbolic learning, as required in reading and arithmetic. Consider, for example, some of the skills required to write the letter "S". First of all, the child must be able to sustain a sitting posture and to concentrate on the task at hand, ignoring distracting stimuli, such as other visual stimuli, "background noise", visceral sensations, etc. He must be able to innervate specific body muscles in order to manipulate a pencil. Next, he must be capable of executing a circular movement in a counterclockwise direction, then reverse direction, going into a circular clockwise direction, and then stop at a given point. This involves eye-hand coordination, left-right as well as top-bottom orientation. If he is copying it from the blackboard, he must be capable of far to near visual accommodation. On the other hand, if he is responding to the teacher's dictating the letter, he must be able to translate an auditory stimulus to a motor response. This in turn involves auditory decoding, auditory and visual retention, associative processes, and neuromuscular control.

One can anticipate learning problems for the first grader who has a developmental lag in any area of perception, as well as for the youngster who appears to have adequately functioning sensory channels but who has not learned to integrate and synchronize these modalities or systems so that he can function effi-

ciently. The purpose of the project, then, was to provide a perceptual enrichment program for all kindergarten children, with emphasis on intensive, perceptual training for those youngsters who manifested a deficiency in this area of development. It was an attempt to fill in sequential gaps in early childhood developmental learning so as to prevent or minimize learning disabilities.

Rationale

Common sense dictates the practicality of identifying and remediating learning disabilities as early in a child's life as possible. It was, therefore, determined that the program would be one of "prevention," with emphasis on helping the kindergarten child manifesting a perceptual deficit to develop each sensory channel or modality so that he can adequately process, integrate, and interpret information in his environment. This appears to be fundamental to preparing him for the academic curriculum, which is heavily weighted in the interpretation of auditory and visual stimuli.

Moreover, adequately functioning sensory channels make the child better equipped to focus and direct his attention so that he is not unduly distracted by extraneous environmental stimuli. Thus, through a multi-modality, inter-modality approach it was proposed to train the child to focus and direct his attention to solve problems and to become organized and self directed.

Program Objectives

Program objectives as outlined in the proposal were as follows:

I. Identify all incoming kindergarten children who have perceptual deficits.

II. Provide a structured program of perceptual training to all kindergarten and primary grade students.

III. Provide in-service training for all kindergarten and primary grade teachers, both public and non-public, in the methods and techniques of perceptual training.

IV. Provide a library of video tapes and material for study and dissemination directly and through the Regional Educational Laboratory in Philadelphia and the Clearing House for ERIC in Washington, D. C.

NOTE: Although the statistical evaluations are not included in the formal objectives, they were built into the original proposal in order to evaluate the effectiveness of the program. A description of project evaluation procedures was required by the government.

Personnel

The Project Director: The Project Director has a Doctoral Degree, as well as a Masters Degree in the field of Psychology. She has had experience as a high school teacher and as a school psychologist, with specialization in the area of learning disabilities. She is also a licensed practicing psychologist. Her role as project director was a full time one. Her responsibilities included the research and operational design of the project, selection and profiling of screening instruments, interpretation of statistical data, and coordination of curriculum development including preparation of video tapes, instructional supervision, preparation of publications, participation at conventions, and presentation of workshops for personnel throughout the state.

Seven Perception Teachers: Each Perception Teacher held a Bachelor's Degree and four had Masters Degrees. Their backgrounds were diversified so as to provide a multi-dimensional approach to training. Their combined areas of specialization included early childhood education, special education, kindergarten-primary grade teaching, reading, remedial physical education, and speech.

They were employed full time, each working with 36 children per day in groups of six and servicing additional children as time permitted. They did all the screening during the summers of 1967 and 1968, and post tested during the springs of 1968, 1969, and 1970.

The perception teachers met weekly with the project director on curriculum development, devising at these times many innovative techniques. They gave demonstration lessons and communicated regularly with classroom teachers. The perception teachers held conferences with the parents of each child and in many cases participated in the regular teacher-parent conferences. They addressed P.T.A. groups and at times lectured to other professional and lay organizations.

The project director and perception teachers developed a file of 700 training techniques which are available to the public. They also prepared a set of demonstration video tapes which will be made available to interested professional personnel.

Secretary: The secretary was also a full time employee. In addition to arranging appointments for screening, she performed all clerical tasks, including recording and sorting statistical data, processing requisitions and maintaining an inventory.

Consultants: Dr. Eileen Canty, Psychology Professor at the College of New Rochelle, New York, was the statistical consultant for the project. However, the data processing was done at the Computer Center of Seton Hall University. The project director consulted with Dr. Newell C. Kephart and

studied with Mrs. Elizabeth Freidus and Drs. Ilg and Ames during the planning phase of the project. She also attended innumerable conventions and meetings and visited centers such as The Cerebral Palsy Unit of the N. J. Orthopedic Hospital in Orange, New Jersey, which has an excellent center coordinated by Mrs. Marie Nicholas.

During the first year of the operational grant a workshop was run for the staff of the Union schools, the parochial schools and neighboring districts by such authorities in the field as Dr. George Early of Purdue University; Charles Drake of the Reading Research Institute, Wellesley, Massachusetts; and Eleanor Messing of Southern Connecticut State College.

Prominent specialists in New Jersey such as Dr. Elizabeth Spears, neurologist, Dr. John Regan, psychiatrist, Dr. Howard Eisenstadt, opthalmologist, and Drs. Seymour Lesser and Harold Solan, optometrists, were also consulted.

Volunteer Personnel: Parents volunteered as aides during the screening and post testing periods. The local Women's Club made items such as stilts (made from juice cans) which were used for training techniques. High school students were also of considerable help during the summer testing programs.

Procedures

Report on Each of the Objectives Listed Above for the Kindergarten Class Entering School September, 1967.

Objective I. Identify All Pre-kindergarten Children Who Have Perceptual Deficits.

As outlined in the proposal, incoming kindergarten children residing in Union, New Jersey, were screened for perceptual deficits during the summer prior to their entering kindergarten. Included in the screening were all public school children as well as those who expected to attend parochial schools or the Campus School of Newark State College, Union, New Jersey.

It was determined to establish a control group in a neighboring community. In the town of Summit, N.J., two schools were selected in areas which are socio-economically comparable to Union. The children from Summit were screened with the same instruments and by the same teachers who tested the Union children. Both groups of children were evaluated during the summer of 1967.

A. Screening Instruments.

Several factors had to be taken into consideration regarding screening instruments:

1. The children were young, ranging in age from four years eight months to five years eight months. Therefore, they would have a relatively short attention span.

2. These youngsters were unfamiliar with a formal type of school setting, so that developing rapport and maintaining interest were of utmost importance.

3. The most difficult decision involved selecting predictive tests which would assess developmental areas basic to academic success. Moreover, although local norms would be established, these instruments had to have a basal level considerably below 4 years 8 months in order to allow for proper evaluation of all children tested and in order to avoid frustration on the part of the child at the onset of testing.

4. The tests were to be administered by the perception teachers, some of whom had been hired just prior to the onset of testing. Therefore, the tests had to be easy to administer and score during the testing process.

It was determined to assess the four developmental areas, using the instruments listed below.

A. Perceptual Motor Match

   1. The Goodenough Harris Draw-A-Man

   2. Four geometric designs:
      These designs were presented one at a time and were to be copied by the child.

   3. The Simkov Perceptual Organization Inventory

B. Auditory Dynamics

   1. The Auditory Vocal Sequencing Test of the Illinois Test of Psycholinguistic Abilities (ITPA).

   2. The Padalino Clapping Patterns

C. Associative Processes

   The Auditory Vocal Association Test of the ITPA

D. Gross Motor Orientation

   Four subtests of the Purdue Perceptual Motor Inventory

1. The Walking Board: Forwards (F), Backwards (B), Sidewards (S)
2. Body Identification
3. The Kraus-Weber Test
4. Angels-in-the-Snow

These children were also screened for visual and auditory acuity, as well as for eye muscle imbalance. These latter findings, however, were not used for the purpose of selecting children for intensive perceptual training.

B. Screening Method

During the initial summer testing program four children were screened per hour, each child spending approximately fifteen minutes at each of the four stations. One perception teacher was permanently assigned to a station and administered the same part of the test battery to all the children. The teacher at Station 1 administered the tests under Perceptual Motor Match. Station 2 was used for the Gross Motor Orientation Test. Station 3 covered the Padalino Clapping Patterns, as well as both subtests of the ITPA. Visual and Auditory Acuity were assessed at Station 4.

An additional 145 children were tested from September 14 through September 20 in both Union and Summit. These included new entrants and absentees. The numbers of children screened at the different schools are included in Table 1.

TABLE 1

Location and Number of Children Screened
1967 Kindergarten Class

Location	No. Screened
Union Public Schools	729
St. Joseph's (Maplewood)	33
St. Paul's (Irvington)	8*
Campus School	22
Roosevelt & Jefferson Schools (Summit)	77
Total Screened	869

* St. Paul's Irvington had only eight Union residents in its kindergarten.

Children screened during the summer were accompanied by their mothers, who spent the hour in the following ways:

1. Viewing a video-tape demonstration of perceptual training techniques by Mrs. Freidus of Columbia University. This tape had been made at Washington School during the Spring of 1967.

2. Filling out a questionnaire regarding the socio-economic status of the family and experiential opportunities of the child.

3. Being interviewed by a Psychologist, Mrs. Gwendolyn McCarthy, with respect to the birth and developmental histories of the children.

C. Selection of Children for Intensive Perceptual Training.

The facilities of Seton Hall University's Computer Center were used to derive and compute weighted scores and to identify the percentile rank of each child for each developmental area and total score. Each formula was arranged to yield scores from zero to 100. Table 2 contains the weighted scores used to assess performance in each of the developmental areas.

TABLE 2

Formulas for Weighted Scores

Score	Formula
A	$\frac{50 \times (\text{Simkov \& Geometric Designs} + \frac{\text{Draw-A-Man}}{35})}{19}$
B	$\frac{100 \times \text{AVST} + \text{Padalino Clapping Patterns}}{58}$
C	$\frac{100 \times \text{AVAT}}{26}$
D	$\frac{100 \times \text{WB (F)} + \text{WB (B)} + \text{WB (S)} + \text{BI} + \text{Angels} + \text{KW}}{24}$
Total Score	$\frac{A + B + C + D}{4}$

Figures 1 through 5 are histograms showing the distributions of 1967 kindergarten children throughout the score ranges for areas A, B, C, D, and total score, respectively.

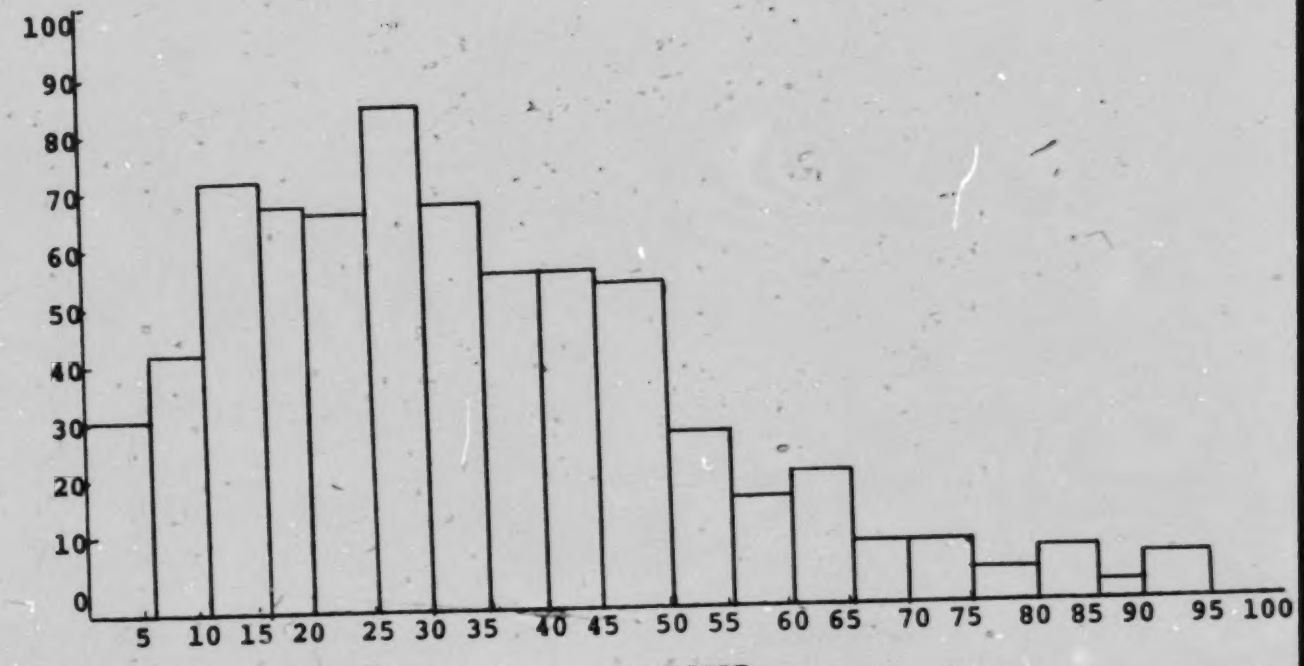


Figure 1. Histogram describing the distribution of scores in Area A - Perceptual Motor Match for the 1967 Kindergarten Class.

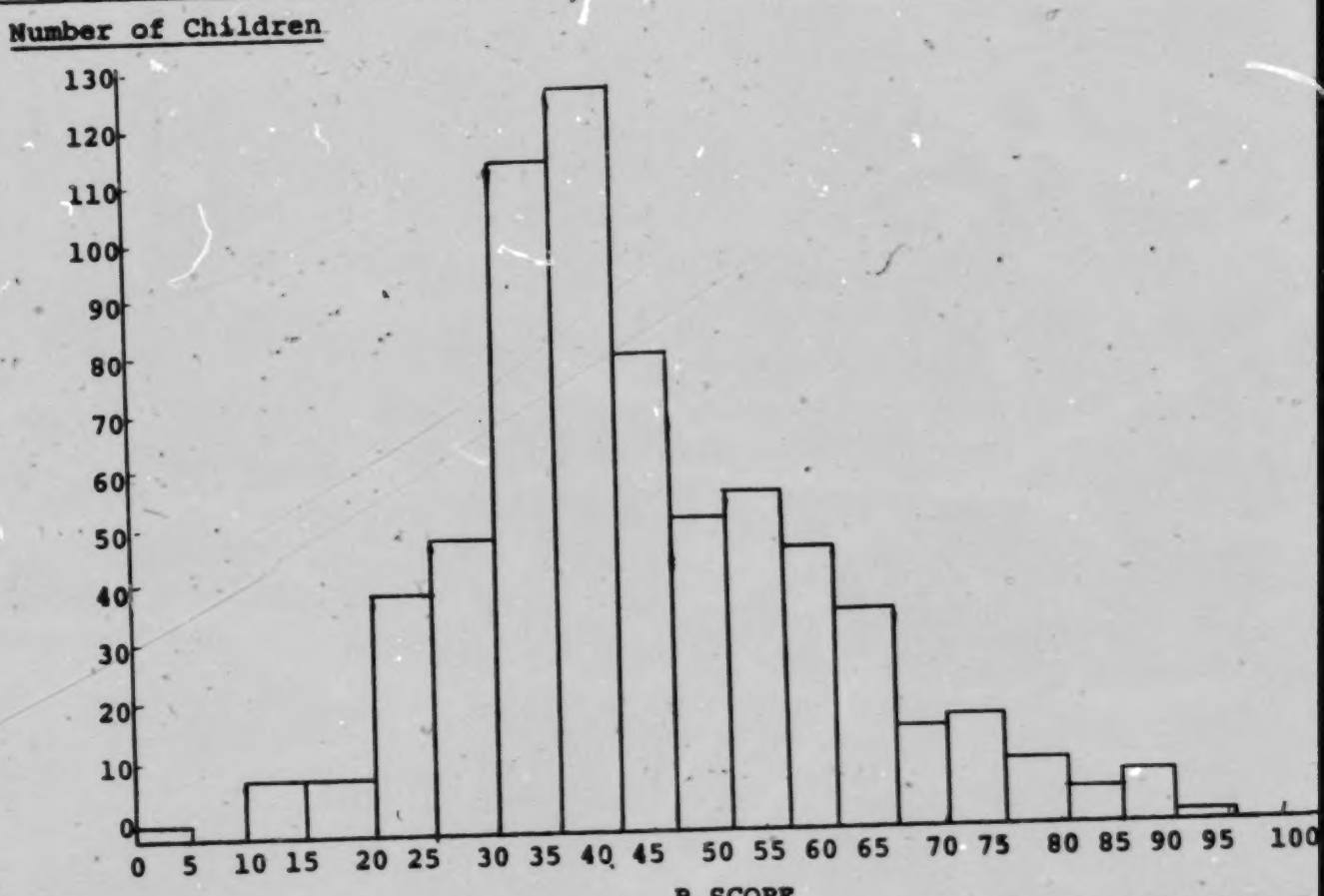


Figure 2. Histogram describing the distribution of scores in Area B - Auditory Dynamics for 1967 Kindergarten Class.

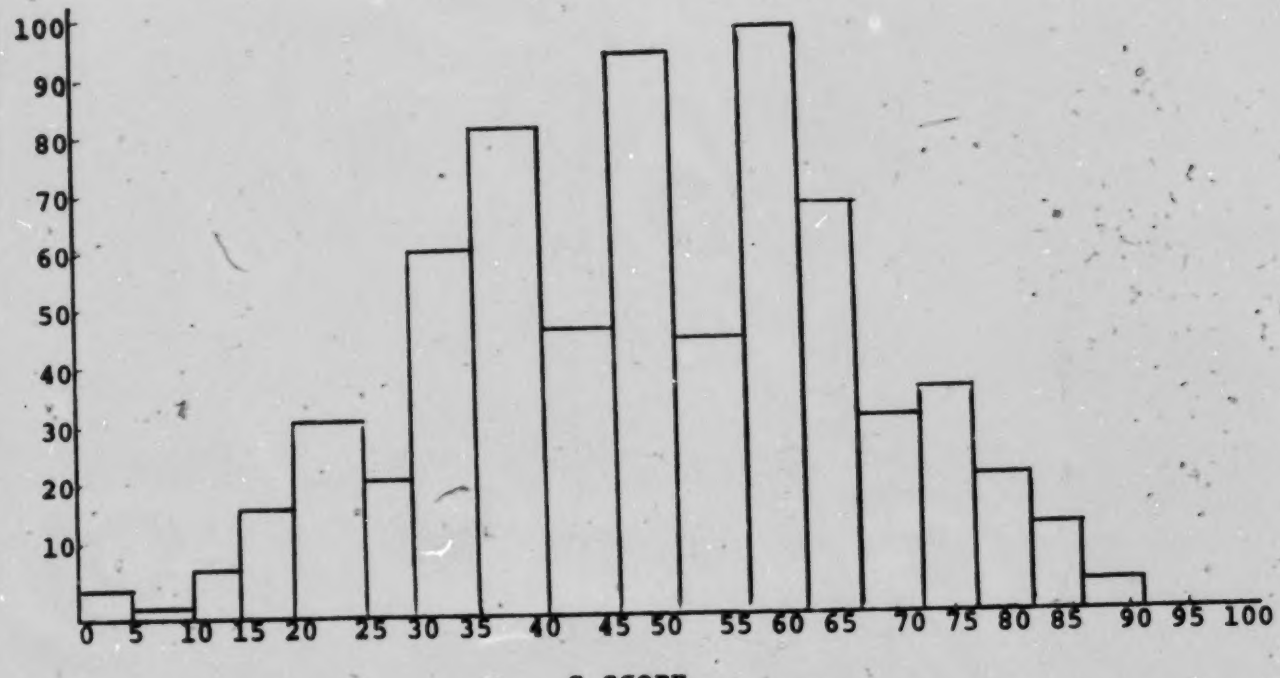


Figure 3. Histogram showing the distribution of scores in Area C - Concept Formation for 1967 Kindergarten Class.

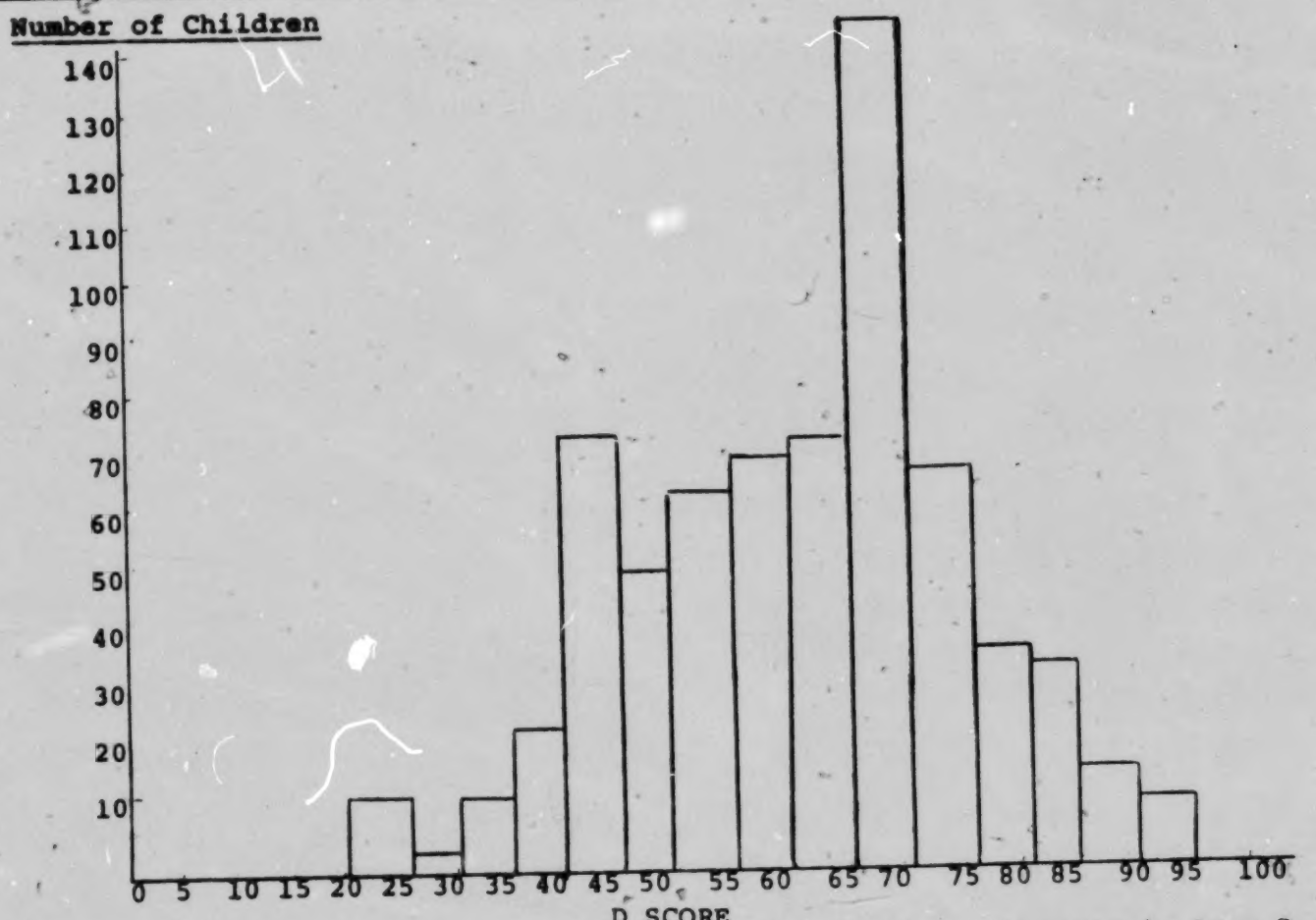


Figure 4. Histogram describing the distribution of scores in Area D - Gross Motor Orientation for 1967 Kindergarten Class.

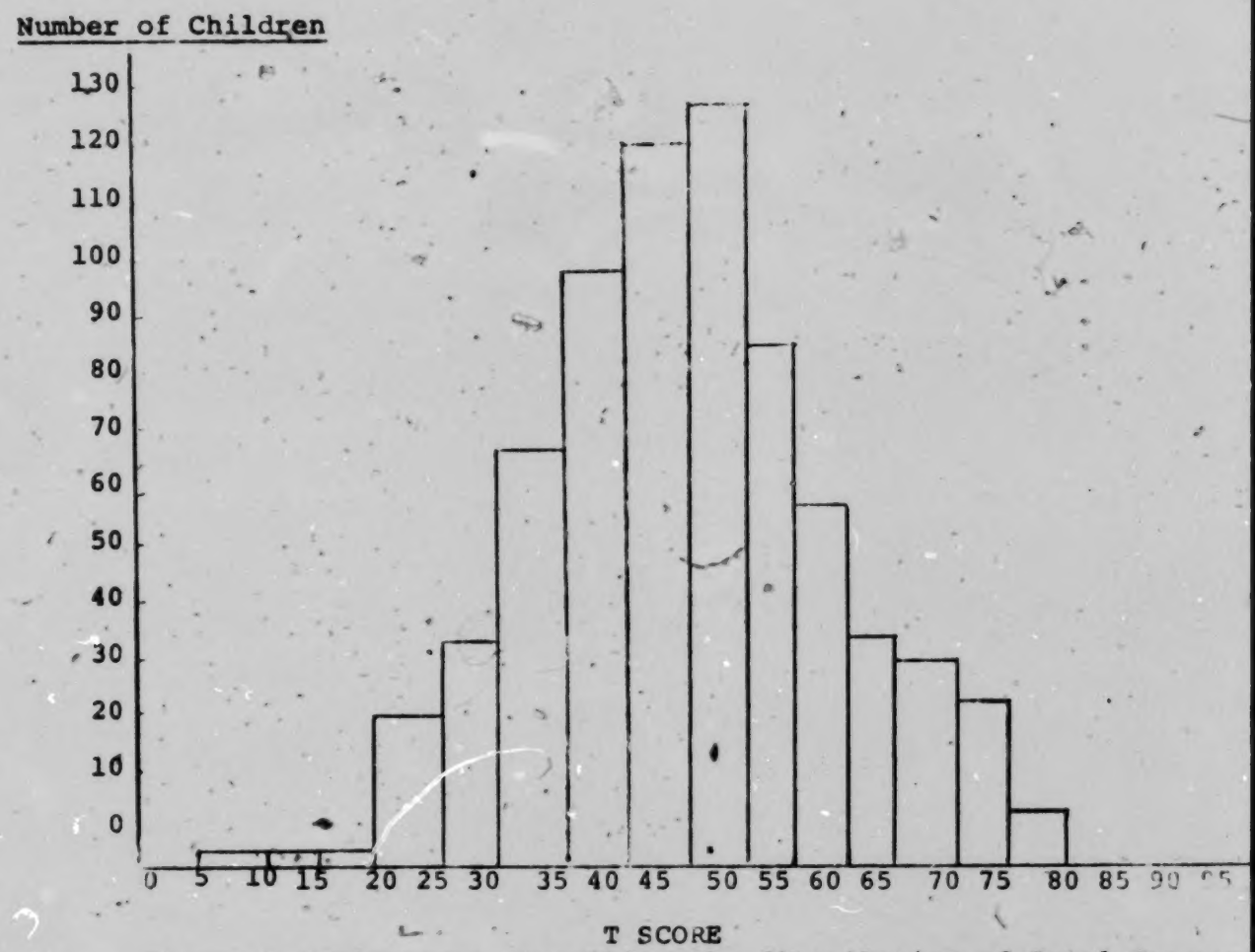


Figure 5. Histogram describing the distribution of Total Scores for 1967 Kindergarten Class.

It was determined to include in the program of intensive perceptual training those kindergarten children in Union (including public, parochial, and Campus Schools) who scored in the lowest 5% of any one or more of the subtests or who fell in the lowest 10% of the total score. The number of children from each school who participated in the program are listed in Table 3. The total of 186 represents 24% of the kindergarten population of 1967.

TABLE 3

School and Number of Participants in Program
1967 Kindergarten Class

School	Number
Battle Hill School	32
Connecticut Farms School	29
Franklin School	25
Hamilton School	6
Jefferson School	28
Livingston School	32
St. Joseph's School *	4
Washington School	33
Total	186

* The two largest parochial schools in Union, New Jersey. St. Michael's and Holy Spirit, do not operate kindergartens. In the Fall of 1968 perceptual training was given to the first graders who transferred from the public schools and who still evidenced a perceptual deficit.

Objective II. Provide a Structured Program of Perceptual Training to all Kindergarten and Primary Grade Students.

A. Training Procedures.

Four days a week the children identified as having a perceptual deficiency were taken out of the kindergarten room for perceptual training in groups of six. The perception teachers worked in separate rooms, cafeterias, or other areas, depending on what was available in their respective buildings. On the fifth school day, the perception teacher gave demonstration lessons in the kindergarten class, or she took, in groups of six, the children in each class who were not receiving intensive training. Thus, over 700 children were involved to some degree in the program.

Training procedures embraced the philosophies and techniques of some of the foremost child study specialists in the fields of Psychology, Education and Physical Therapy. These included Kephart, Barsch, Cruickshank, Freidus, Gesell, Bice, Ayres, and others.

Thus, the approach was an eclectic one, with training in deficit modalities concomitant with reinforcement of the stronger modalities. These techniques were structured to sharpen all the sensory channels--gustatory, olfactory, tactile, kinesthetic, auditory, and visual. Emphasis was placed on child-centered learning through diagnostic teaching. Thus, to recapitulate, through a multi-modality and intermodality approach to learning, the child was trained to focus and direct his attention, to solve problems, and to become organized and self-directed. As an illustration, two sample lesson plans are listed below.

1. Plan I:

   a. Five-minute warm-up exercises to develop muscle strength and flexibility and to stimulate the cortex, thus, purportedly making the child receptive to training in form perception. Counts per exercise are progressively increased.

      (1) Toe touching-3 counts:
      Stand erect, feet 12 inches apart, arms overhead. Bend forward to touch floor between feet.

      (2) Arm Circling - 10 counts:
      Make large circles with both arms. Half count forward, half backward.

      (3) Lateral Bending - 3 counts:
      Bend sidewards from waist to left. Return to starting position and repeat to right. Bends to left and right count one.

(4) Hopping:
Left foot - 5 counts; Right foot - 5 counts;
Both feet - 3 counts

b. Form Perception:
Child copies designs from paper to pegboard, e.g., rectangle with two vertical lines in red and two horizontal lines in yellow.

c. Gross Motor
Obstacle Course (concomitantly verbalizing the concepts of "under," "over," and "between.")

(1) Jump the brook
(2) Balance beam (walk)
(3) Follow path made by a rope
(4) Run between pins (zig-zag)
(5) Climb over rope (knee high)
(6) Jump over blocks (low)

2. Plan II:

a. Five minute warm-ups as mentioned under Plan I.

b. Form Perception:
Assorted parquetry designs, level depending upon the ability of the youngster. During this activity the teacher takes one child at a time to the blackboard. To the beat of a metronome the child points alternately with his finger (later with a pointer) to two colored dots. This is done on the horizontal, vertical, and diagonal axes.

c. Gross Motor:
Walking on "stilts" (made of juice cans and rope) to develop laterality.

Parent Orientation and Feedback

Parents were prepared for the program through numerous newspaper articles, letters mailed to each home, and video tapes which were viewed while their children were being screened.

During the Open House P.T.A. at the beginning of the school year, the perception teachers spoke with the parents of kindergarten children. They also held individual parent conferences during the year and, as stated previously, participated in the regular teacher-parent conferences.

The project director also ran an orientation program for the parents each operational year of the project. At these meetings video tapes of their children's activities were featured.

Repetition of the Program With the Kindergarten Class of 1968

Because of the tentative plans in Summit for a remedial program emphasizing gross motor activities, it was necessary to select a different community for a control school system for the kindergarten class entering school in 1968. The town selected was Hillside, N.J., whose socio-economic make-up is very much like the town of Union.

Objective I. Identify All Pre-kindergarten Children Who Have Perceptual Deficits.

During the summer of 1968 the project staff followed the same screening procedures which had been used during the initial summer testing program (1967) i.e. testing in the areas of Perceptual Motor Match, Auditory Dynamics, Concept Formation and Gross Motor Orientation. As before, included in the screening were all public school children as well as those expected to attend parochial schools and the Campus School of Newark State College.

The same tests which had been administered to the incoming kindergarten children during the summer of 1967 were also used for screening this group of incoming kindergarten youngsters. However, the visual and auditory acuity tests were deleted because they are given early in the academic year by the school nurse. It was determined that to administer them during the summer would be redundant. Moreover, these scores had not been used during the initial year of the project for the purpose of selecting children for training, but rather for diagnostic purposes.

As with the class of 1967, experimental and control groups were established in order to evaluate the effectiveness of training. Accordingly, 665 children from Union and 175 children in the neighboring community of Hillside, New Jersey, were tested.

The experimental and control groups for the 1968 kindergarten class are as follows:

Group I: Twenty-four children, receiving training were matched with 24 children receiving no perceptual training. (Complete data were available for 24 pairs and only these are reported.)

Group II: A sample of 32 children from Union was matched with 32 Hillside children. Neither group received training.

Group III: Hawthorne Control Group: Twenty Union children receiving perceptual training were paired with 20 Hillside children receiving "attention" in groups of six for one half-hour per day. Techniques included unstructured kindergarten activities, such as "show-and-tell," stories read by the teacher,

and occasional unstructured games to add variety and to maintain rapport. (Complete data were available on only 20 pairs and only these are reported.)

Group IV: Twenty-one Union children receiving perceptual training were matched with 21 Union children receiving no training.

The data were again processed at the Computer Center at Seton Hall University. Weighted scores and percentile ranks were prepared for the purpose of selecting children for intensive perceptual training. However, because it was difficult to find a sufficient number of matched pairs for the three groups of children receiving training, it was necessary to accept some children who fell in the lowest 20% in one or more of areas A, B, C, D.

The number of children from each school who participated in the program are listed in Table 4. The total of 121 represents 18% of the kindergarten class of 1968.

TABLE 4

School and Number of Participants in Program
1968 Kindergarten Class

School	Number
Battle Hill School	18
Connecticut Farms School	14
Franklin School	25
Hamilton School	6
Jefferson School	21
Livingston School	18
Washington School	19
Total	121

As with the 1967 kindergarten class the parents of each child from the 1968 kindergarten class filled out a questionnaire, so that data relevant to his socio-economic background, birth, and developmental history were available.

Objective II. Provide a Structured Program of Perceptual Training to all Kindergarten and Primary Grade Students.

With this class the perception teachers worked with the children for one half hour per day in groups of six, five days per week, instead of four days per week. Weekly classroom demonstrations were not continued on Fridays because of the complexity of scheduling kindergarten and first grade pupils. However, there was continual communication between classroom and perception teachers. Moreover, the Union kindergarten teachers had observed demonstration lessons the year before. Weekly workshops for perception teachers continued throughout the academic year.

Objective III. Provide In-Service Training for all Kindergarten and Primary Grade Teachers both Public and Non-Public in the Methods and Techniques of Perceptual Training.

In each building, Learning Disability Specialists and classroom teachers were invited to observe the perception teachers working with the children. They were encouraged to borrow materials and equipment for use with the other youngsters in their classrooms. Perception teachers gave demonstration lessons in both the parochial and public schools in Union Township.

A workshop, utilizing video tapes, was run by the Project Director for teachers new to the teaching staff and for other interested staff members, e.g. Learning Disability Specialists, Speech Correctionists, and Special Education Teachers. It is expected that this will become a routine part of in-service training.

Information regarding the program has been disseminated widely throughout the country to educators, specialists in related fields, and to lay people.

1. The project, including video tapes of actual lessons, was featured at:

   a. The Council on Exceptional Children Chapter at the New Jersey Teachers Convention in Atlantic City in November of 1968.

   b. The International Convention of the Association of Children with Learning Disabilities, Fort Worth, Texas, March 7, 1969.

      At the ACLD Convention, over 175 teachers and specialists representing 22 states requested available and subsequent published material.

2. Additional presentations were made to the following groups:

   a. Graduate classes at Newark State College in Union.

   b. Meeting of graduates of School of Education, Fordham University.

   c. Meeting of Learning Disability Specialists throughout Union County.

   d. Numerous Educators throughout the State of New Jersey and some from Massachusetts and Pennsylvania.

Objective IV. Provide a Library of Tapes and Material for Study and Dissemination Directly and Through Appropriate Governmental Agencies such as the Clearing House for ERIC in Washington, D. C.

A series of video tapes has been prepared on the screening methods and training techniques in all the modalities. The director and staff of perception teachers have also compiled a kit of 700 training techniques with cross-references to indicate the specific purposes for which they were used. The kit includes a rationale, bibliography, and a list of supplies accompanied by the addresses of the manufacturers. The tapes and kits will be made available to interested professional personnel.

EVALUATION

In individual conferences with Dr. Newell Kephart and Mrs. Elizabeth Freidus, they expressed doubts about the possibility of obtaining significant statistical gains when testing children exhibiting developmental lags. However, it was decided to attempt to express quantitatively the effectiveness of the project. This seemed particularly relevant in view of the evaluation criteria requested by the Office of Education.

Establishing Control Groups for the 1967 Kindergarten Class

Since kindergarten and primary grade pupils usually manifest marked developmental gains, it was decided to establish experimental and control groups in order to determine if the gains in post-test scores reflected normal maturation which evolves with time and the regular school curriculum, or whether gains also reflected the results of the perceptual training program.

It was realized that the project might, consciously or unconsciously, affect the curriculum emphasis or teaching approach of some of the Union kindergarten teachers since children not selected for training were given an enrichment program and all kindergarten teachers were appraised of it. Therefore, control groups were established, not only in Union, but also in the neighboring community of Summit. The two schools selected in this town were comparable, socio-economically, to those in Union. As cited in Table 1, 77 children were tested in Summit during the summer of 1967. The same examiners and procedures were followed in both communities.

In addition to comparing the total groups tested in both school systems, several sets of experimental and control groups were selected and were composed of matched pairs. These children were paired according to sex, age (within six months) and scores in all measured areas. Members of each pair were selected on the basis of similar profiles, each pair had to have scores in area A within at least one standard deviation of each other. The same criterion (within one standard deviation) was applied to the B, C, D and Total Scores as well.

Although it would have been desirable to include a measure of intelligence among the criteria used for matching it was not possible to administer intelligence tests at the time the children were matched. It was felt that, to some degree, some of the areas tapped during the screening process, particularly the Auditory Vocal Association Test, took this variable into consideration. Nevertheless, in January of 1969, (about mid-year of the first grade) the Lorge Thorndike Intelligence Test was administered to groups of matched pairs. A comparison was made of the means of the samples of matched pairs described as Groups I and II of the kindergarten sample.

There were no significant differences between the means of either set of matched pairs.

Since the human being is so complex, there are undenyingly variables affecting the test results which could not be controlled in this study. It would have been desirable to have matched the children on the basis of environmental influences, reaction to testing, motivation, emotional or neurological involvement, etc. However, all these factors would have been difficult to measure, particularly since the children were just entering the school system. Since the total number of children tested in Summit was 77 as compared with 792 in Union, the numbers of matched pairs available were necessarily limited.

Experimental and Control Groups for 1967 Kindergarten Class

The Experimental and control groups established to evaluate the effectiveness of the program are listed below:

Group I: Twenty-eight children in Union receiving the complete program of training (CP) were matched with 28 children in Summit receiving no training (NT).

Group II: This group represented a sampling of all children in the two school populations who fell above the cut off points. The Summit control group II received no training (NT). The Union Experimental Group II received an enrichment program (EP) one day per week during the kindergarten year only. There were 31 children in each group.

Group III: Twenty-six children in Union receiving the complete program of training (CP) were paired with 26 children in Union receiving training in all the modalities except gross motor orientation. (NGM)

TABLE 5

Composition of and Type of Training Received in Each Area by Experimental (Exp) and Control (C) Groups of 1967 Kindergarten Class

GROUP	N	AREA			
		A Perceptual Motor Match	B Auditory Dynamics	C Associative Processes	D Gross Motor Orientation
I - Exp - Union	28	T	T	T	T
- C - Summit	28	NT	NT	NT	NT
I - Exp - Union	31	EP	EP	EP	EP
- C - Summit	31	NT	NT	NT	NT
III - Exp - Union	26	T	T	T	T
- C - Union	26	T	T	T	NT

1. T - indicates training in the specific area. When training is received in all areas, the complete program (CP) was received.

   NT - indicates no training in the specific area.

   EP - indicates enrichment program.

Post Testing

It was determined to post test in the Spring of 1968 all the children who had been screened in Union and Summit during the summer of 1967 in order to compare the growth made by the various groups of children. In the spring of 1969 and 1970 only the groups of matched pairs for the classes of 1967 and 1968 were tested because of the number of children involved. Testing was done in the same manner and by the same perception teachers who had done the pretesting. The same tests were administered. The perception teachers did not test children in their own buildings so that they would not be aware of which children were receiving training.

Results of Data for the Kindergarten Class of 1967

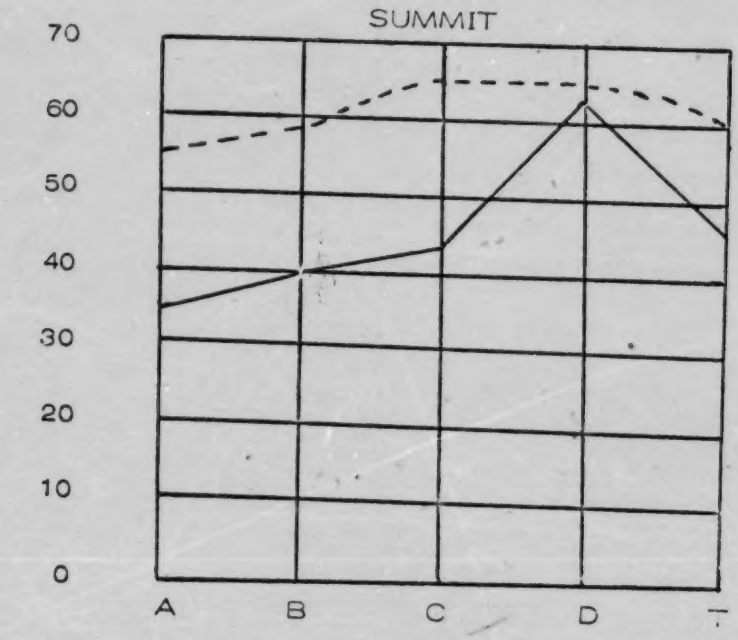
A. The Entire Population Tested in Union compared with the Seventy-Seven Children in the Control School System.

Means and standard deviations were computed for each of the four composit scores, A, B, C, D, as well as for the Total (T) of the composit scores. These data are provided in Table 5. Figure 6 illustrates the mean scores of pre and post tests for Union and Summit. Comparisons were made of these pre and post test data for the entire Union population and for the 77 children from Summit, the control school system. The N's for each test are lower than the total N because some children, especially in the pre-test refused the task. A few test scores were invalidated for other reasons such as inattention, inability to understand instruction, interruptions, etc. The lower N's for the post tests generally represented the normal attrition due to moving, changing schools, etc.

Inspection of Figure 6 suggests that whereas both populations gained appreciably in the tests tapping visual-motor integration (A), auditory dynamics (B), and concepts (C), neither group showed a substantial gain in the area of gross motor coordination (D).

The relatively little growth made by both groups in the area of gross motor coordination may be due to:

1. The nature of the test. The Perceptual Motor Survey is a clinical instrument, and, therefore, is not designed for quantitative evaluation. Each of the four tests used in this study has a range of four points. The examiners found that especially with respect to Angels-in-the-Snow and Body Identification, the scoring system did not differentiate between levels of ability. This was brought to the attention of Dr. Kephart and his staff, but they felt that the question of degree was irrelevant. In the case of Angels-in-the-Snow, for instance, the child either can or cannot differentiate between the two sides of his body. Nevertheless, for the purpose of quantitative evaluation, the range of the gross motor tests is restricted.



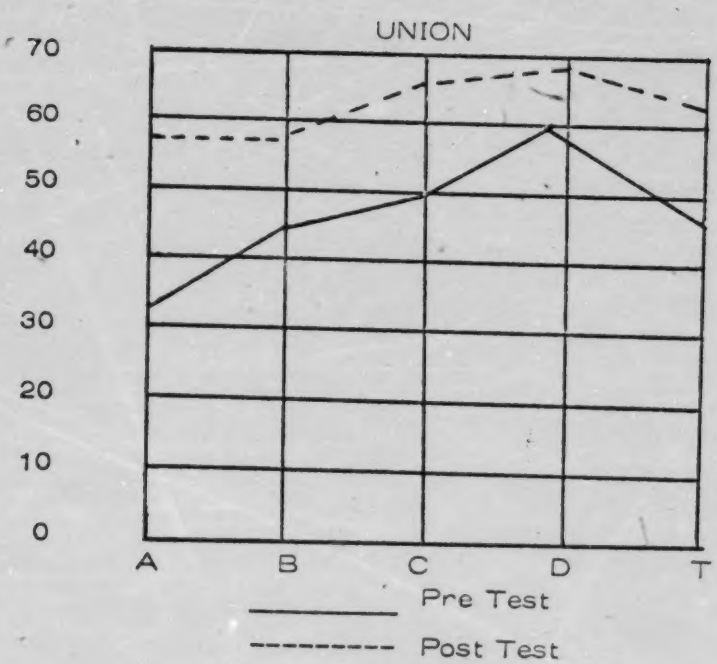


Figure 6. Means of Pre and Post Test scores in Areas A, B D D, and T for Union and Summit.

2. Perhaps the area of physical development tapped by this test reaches a temporary plateau at this level of maturation. DeHirsch (1966 P. 35) suggests that by kindergarten age, gross motor skills such as hopping, throwing, and balancing, "are probably too well established to serve as a basis for differentiation."

Although statistical comparisons of the data were not made, inspection of pre and post data suggests that each population made greater gains than the other in two of the four areas tested, i.e., the Union children seem to have improved more in the areas of visual-motor integration and, only slightly, in gross-motor coordination than did the children in the control school system. The latter improved more in the areas of auditory dynamics and in concepts than did the Union children. The differences between the means of pre and post test scores for Union and Summit are included in Table 6 and Figure 7.

If these differences in areas of growth for the two populations are significant and if they reflect other than chance factors, the following points may be considered. It should be noted, however, that these remain only the most tentative suggestions until the differences are verified.

1. The perceptual training program may have consciously or unconsciously influenced some of the classroom teachers in Union to stress visual-motor and gross-motor activities, particularly since the current literature (Barsch 1965) stresses techniques in these two areas of development, (Kephart 1963).

2. There may be a difference in emphasis in the kindergarten curriculum in each school system. Although the teacher's curriculum in both school systems offer well balanced programs, teaching emphasis and methods can vary with the individual teacher's orientation, not only from one school system to the other but within the same school system, a contributory factor which may have affected the observed differences in areas of growth.

B. A Comparison of the Three Groups of Matched Pairs

1. Variables A, B, C D and T.

Since the major areas were those discussed at length above, these were the subject of the first analyses for the three primary groups of matched pairs. Means, standard deviations, and T-tests were computed on the post test data for variables A, B, C, D and T for the three sets of matched pairs.

a. Experimental Group I comprised 28 sets of matched pairs. The Union students received training in all areas and the

TABLE 6

The Difference Between the Means of the Pre and Post Tests Scores in Areas A, B, C, & T for Union and Summit 1967 Kindergarten Class

	Difference Between Pre and Post Test Means	
AREA	UNION	SUMMIT
A	25.50	18.78
B	14.88	16.76
C	16.64	22.34
D	5.91	1.98
T	15.74	15.28

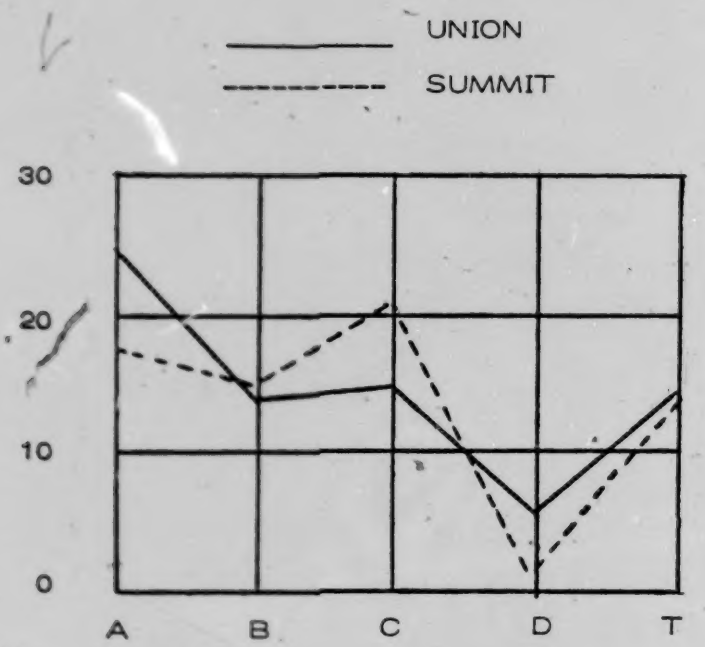


Figure 7. The difference between the means of pre and post test scores in Areas A, B C D, and T for Union and Summit 1967 Kindergarten Class.

Peg Board Patterns:
Part of an In-Service Videotape Production

Computer Center Programming Work at
Seton Hall University*.

Summit children had no training. The Summit Control Group received significantly lower scores in the area of Gross Motor Orientation than did the Union children. The t-value was significant at the .05 level. (See Table 7)

TABLE 7

1968 Post Test Means, SD's and t's in Areas A, B, C, D, and T for Control and Experimental Groups I. (N = 28)
1967 Kindergarten Class

	SUMMIT		UNION		
Area	Mean	SD	Mean	SD	t
A	46.25	14.86	49.60	13.09	- .89
B	50.92	13.30	48.25	15.23	.70
C	61.64	14.01	57.39	15.07	1.09
D	61.67	9.09	67.14	10.59	-2.07*
T	55.62	8.75	56.04	10.16	- .16

* Significant at the .05 level.

b. Table 8 contains the data for Experimental and Control Groups II. The Union group received no formal training, only the enrichment program formerly described. The Summit group received no training. No significant differences exist in any area.

Table 9 includes the data for Experimental and Control Groups III. Boths groups were composed of Union students receiving training. The difference was that the experimental group received training in all areas while the control group had training in all areas except Gross Motor. There were no significant differences between these two groups. The largest difference, although not significant, was in area A, visual motor integration and not in gross motor.

2. T-tests on the Nine Sub-tests of Variables A, B, C, D and T.

Since the score in each area represented a weighted combination of scores from several tests, the data on each individual test were examined. Although the groups were matched on pre test scores, this matching was done on the basis of the weighted score. Consequently, the groups could still differ on one individual sub test.

TABLE 8

1968 Post Test Means, SD's and t's in Areas A, B, C, D, and t for Control and Experimental Groups II. (N = 31)
1967 Kindergarten Class

	SUMMIT		UNION		
Area	Mean	SD	Mean	SD	t
A	59.38	11.59	64.06	11.52	-1.59
B	60.51	17.62	58.51	14.45	.48
C	69.87	16.09	69.64	11.22	.06
D	69.32	8.46	71.77	9.33	-1.08
T	65.27	8.94	66.43	7.96	-.53

TABLE 9

1968 Post Test Means, SD's, and t's in Areas A, B, C D, and t for Control and Experimental Groups III. (N = 26)
1967 Kindergarten Class

	No Gross Motor Training		Complete Program		
Area	Mean	SD	Mean	SD	t
A	45.61	10.57	50.96	10.94	-1.79
B	50.50	15.27	48.80	10.33	.46
C	56.26	10.86	57.11	12.23	.26
D	64.03	11.89	65.80	10.56	.56
T	54.52	8.52	56.10	6.50	.75

Tables 10, 11, and 12 contain the means, standard deviations, and t's for Experimental and Control Group I, II, and III respectively. There were no significant differences on any subtest in the pre testing for any set of matched pairs. (The subtest walking board (F, B, S) was eliminated because of the complexity involved in data processing.

TABLE 10

Pre Test Means, SD's and t's for Individual Subtests of Control and Experimental Group I. (N = 28)
1967 Kindergarten Class

Subtest	SUMMIT		UNION		t
	Mean	SD	Mean	SD	
Simkov	2.17	1.70	1.92	1.85	.52
Geometric Designs	1.67	.94	1.44	1.05	.86
Draw-A-Man	9.87	4.63	8.76	5.00	.77
Body Identification	1.20	.50	1.25	.64	-.31
Kraus-Weber	2.79	1.17	2.39	1.28	1.15
Angels-in-the-Snow	1.41	.71	1.17	.66	1.23
Padalino Clapping Patterns	2.60	2.45	2.67	3.28	-.09
Auditory Vocal Sequencing	17.82	4.80	17.25	5.28	.42
Auditory Vocal Association Test	6.78	4.44	6.67	4.48	.08

TABLE 11

Pre Test Means, SD's, and t's for Individual Subtests of Control and Experimental Group II. (N = 31) 1967 Kindergarten Class

Subtest	SUMMIT		UNION		
	Mean	SD	Mean	SD	t
Simkov	6.61	3.17	7.00	2.64	-.12
Geometric Designs	2.93	1.20	2.51	.99	1.49
Draw-A-Man	14.62	4.25	13.78	4.68	.69
Body Identification	1.35	.75	1.45	.89	-.46
Kraus-Weber	3.50	.73	3.30	1.02	.87
Angels-in-the-Snow	1.56	.89	1.60	.89	-.14
Padalino Clapping Patterns	5.13	4.24	4.76	3.85	.34
Auditory Vocal Sequencing	22.27	6.31	21.00	5.59	.82
Auditory Vocal Association Test	10.72	4.59	11.41	4.37	-.60

TABLE 12

Pre Test Means, SD's, and t's for Individual Subtests of Control and Experimental Group III. (N = 26)
1967 Kindergarten Class

Subtest	Program Without Gross Motor Training		Complete Program		t
	Mean	SD	Mean	SD	
Simkov	1.73	1.11	1.76	1.24	-.11
Geometric Designs	1.30	1.08	1.53	.94	-.81
Draw-A-Man	8.66	3.92	8.25	3.83	.33
Body Identification	1.07	.27	1.00	0.00	1.41
Kraus-Weber	2.24	1.26	2.39	1.07	-.44
Angels-in-the-Snow	1.16	.55	1.20	.58	-.29
Padalino Clapping Patterns	2.57	2.17	2.50	2.61	.11
Auditory Vocal Sequencing	15.88	4.15	16.23	4.50	-.28
Auditory Vocal Association Test	5.84	3.65	6.07	3.85	-.22

Comparisons of the means were also made for the post test scores of each of the ten subtests for the three experimental and control groups. The means, standard deviations, and t-values for Experimental and Control Groups I, II, and III are included in Tables 13 14, and 15 respectively.

1. The mean score in Body Identification for Experimental Group I, Union students receiving complete training, was significantly higher at the .05 level than the mean score of the control group. (See Table 13).

2. Experimental Group II, Union students receiving an enrichment program but no formal training, scored significantly higher on the Simkov than did the control group from Summit. This was at the .05 level of significance. (See Table 14).

TABLE 13

1968 Post Test Means, SD's and t's for Individual Subtests of Control and Experimental Groups I. (N = 28)
1967 Kindergarten Class

	SUMMIT		UNION		
Subtest	Mean	SD	Mean	SD	t
Simkov	7.31	2.72	8.32	3.17	-1.24
Geometric Designs	2.48	1.21	2.92	.89	-1.57
Draw-A-Man	14.34	4.23	13.92	3.80	.38
Body Identification	1.41	.86	2.17	1.24	-2.69*
Kraus-Weber	3.17	1.00	3.42	.87	-1.02
Angels-in-the-Snow	1.31	.66	1.53	.83	-1.12
Padalino Clapping Patterns	10.06	4.37	9.21	5.00	.68
Auditory Vocal Sequencing	19.55	5.08	18.96	5.27	.42
Auditory Vocal Association Test	13.58	4.32	12.50	4.81	.89

* Significant at the .05 level.

TABLE 14

1968 Post Test Means, SD's, and t's for Individual Subtests of Control and Experimental Groups II. (N = 31)
1967 Kindergarten Class

	SUMMIT		UNION		
Subtests	Mean	SD	Mean	SD	t
Simkov	10.32	2.66	11.65	1.34	-2.05*
Geometric Designs	3.29	.73	3.46	.67	-1.00
Draw-A-Man	16.87	4.77	17.18	4.66	- .26
Body Identification	2.09	1.01	2.31	1.20	- .76
Kraus-Weber	3.64	.70	3.71	.45	- .49
Angels-in-the-Snow	1.48	.85	1.62	.94	- .62
Padalino Clapping Patterns	11.96	5.11	11.84	3.93	.10
Auditory Vocal Sequencing	23.45	6.94	22.25	5.54	.75
Auditory Vocal Association Test	16.51	5.16	16.40	3.51	.09

* Significant at .05 level.

The Union students receiving the complete program of training, Experimental Group III scored significantly higher on Draw-a-Man (at the .05 level) than did the control group from Union which received training in all areas except Gross Motor. (See Table 15)

It was decided to analyze the data from the groups of matched pairs from another point of view. Improvement in each individual subtest was defined as the gain in score from pre test to post test or post test score minus pre test score. An improvement index was thus computed for each subtest for each student in the three sets of matched pairs. Comparisons of improvement were then carried out. The means, standard deviations, and t's for the differences in improvement on each subtest for the three sets of matched pairs are presented in Tables 16, 17, and 18. The difference in improvement is control group member's improvement minus the improvement of the Experimental group match.

From Table 16 it may be seen that those children receiving the complete program of training, Experimental Group I, showed significant gains at the .05 level when compared to the control group from Summit which received no training. These gains were in Body Identification and the Simkov. This experimental group also approached a significantly higher score in Geometric Designs.

Experimental Group II (EP), those Union children receiving the enrichment program, showed significantly more improvement in Geometric Designs than the control group from Summit which received no training. This result at the .05 level of significance is noted in Table 17.

No significant differences in improvement were noted in Table 18 between the Experimental and Control Groups III, those students from Union receiving a complete program of training and those students receiving all except Gross Motor.

TABLE 15

1968 Post Test Means, SD's and t's for Individual Subtests of Control and Experimental Groups III. (N = 26)
1967 Kindergarten Class

Subtest	Program Without Gross Motor Training		Complete Program		
	Mean	SD	Mean	SD	t
Simkov	8.07	2.97	8.69	2.32	.84
Geometric Designs	2.92	1.03	2.76	1.03	-.55
Draw-A-Man	12.33	2.97	14.65	3.08	2.78*
Body Identification	2.29	1.13	2.11	1.27	-.54
Kraus-Weber	2.96	1.19	3.00	1.05	.11
Angels-in-the-Snow	1.37	.74	1.76	.95	1.70
Padalino Clapping Patterns	9.22	4.90	10.84	3.18	1.42
Auditory Vocal Sequencing	19.70	5.00	18.38	4.63	-.99
Auditory Vocal Association Test	12.22	3.45	12.23	3.94	0.00

* Significant at the .05 level.

TABLE 16

Means, SD's, and t 's for Differences in 1968 Improvement Indices on Individual Subtests for Experimental and Control Groups I. (N = 28) 1967 Kindergarten Class

	Difference in Improvement		
Subtest	Mean	SD	t
Simkov	-.170	2.92	-2.57*
Geometric Designs	-.63	1.57	-2.03
Draw-A-Man	-.18	8.03	- .09
Body Identification	-.75	1.44	-2.50*
Kraus-Weber	-.40	2.29	- .80
Angels-in-the-Snow	-.39	1.13	-1.62
Padalino Clapping Patterns	.71	7.94	.46
Auditory Vocal Sequencing	-.32	5.53	- .30
Auditory Vocal Association Test	.96	4.33	1.16

* Significant at the .05 level.

Note 1. A negative value favors the Experimental Group.

TABLE 17

Means, SD's, and t's for Differences in 1968 Improvement Indices on Individual Subtests for Experimental and Control Groups II. 1967 Kindergarten Class

	Difference in Improvement		
Subtest	Mean	SD	t
Simkov	-.77	4.10	-1.01
Geometric Designs	-.58	1.54	-2.09*
Draw-A-Man	-.87	6.62	- .63
Body Identification	.06	1.65	.20
Kraus-Weber	-.13	1.43	- .52
Angels-in-the-Snow	-.17	1.57	- .57
Padalino Clapping Patterns	.50	7.50	.35
Auditory Vocal Sequencing	.30	4.61	.35
Auditory Vocal Association Test	-.03	3.44	.05

* Significant at the .05 level.

Note 1. A negative value favors the Experimental Group.

TABLE 18

Means, SD's, and t's for Differences in 1968 Improvement Indices on Individual Subtests for Experimental and Control Groups III. 1967 Kindergarten Class

	Difference in Improvement		
Subtest	Mean	SD	t
Simkov	-1.07	2.69	-2.03
Geometric Designs	- .07	1.49	- .27
Draw-A-Man	-2.93	5.75	-1.82
Body Identification	.08	1.36	.11
Kraus-Weber	- .39	2.48	- .74
Angels-in-the-Snow	- .33	1.28	-1.37
Padalino Clapping Patterns	- .85	7.27	-1.67
Auditory Vocal Sequencing	1.93	5.13	1.93
Auditory Vocal Association Test	- .33	5.75	- .29

* Significant at the .05 level.

Note 1: A negative value favors the Experimental Group.

It is interesting to note that there were no significant differences in growth scores on sub-tests tapping gross motor orientation for children receiving gross motor training and those not receiving it. This may be accounted for in several ways:

1. As stated previously, this phase of development may have reached a temporary plateau for five year olds.

2. The test may not measure improvement in this area because of its limited range.

3. The children had had about six months of intensive training. Perhaps more time is needed for training in this area for significant differences in growth to emerge.

Subjectively, the perception teachers noted marked improvement in the spatial orientation, the body scheme, and the physical coordination of the children receiving gross motor training. It should also be pointed out that the children receiving gross motor training received a t-value in the area of visual motor integration which approached the .05 level of significance. Their mean was also significantly greater at the .05 level, in the post testing of Draw-a-Man and approached a significantly higher score on the post test of the Simkov. This is interesting in that the control group received more training in the area of visual motor integration as well as in the other modalities because gross motor activities were deleted from their half hour of training.

Obviously, there seems to be a need for more refined research with respect to the purported effect of gross motor training on perceptual motor match.

C. A Comparison of the Gain Made by All Union Children Receiving Training With That Made by Union Children Not Receiving Training

The above findings seem to indicate that the children receiving perceptual training made significant gains in more subtests than the children not in the training program. It was decided at this point to try to measure relative gains for all Union program children as opposed to all the Union non-program children.

The gains between pre and post test total score, T, the average of A, B, C, D, for the 172 Union program children and the 500 Union non-program children were compared by means of a t-test. The result was extremely significant, yielding a t value of 9.17.

D. A Comparison of Matched Pairs: Union Children Receiving Training With Union Children Not Receiving Training

A possible explanation for the very significant improvement in total score of the program children might be that they had tested lower on the pre-tests and, consequently, there was more room for developmental growth. To investigate the improvement of children who scored low on the pre tests an a posteriori set of matched pairs was selected from those scoring just below the cut off points. Twenty four Union students, who had fallen just below the cut off scores in one or more areas and who were, therefore, receiving training were matched with 24 Union children who had fallen just above cut-off scores and who, therefore, were not receiving formal perceptual training. This latter group received the regular enrichment program which was given to all Union students. The groups were matched according to the same criteria used for the other three experimental and control groups. Comparisons of the means of the pre-tests on seven sub-tests yielded no significant differences in them. (See Table 19). Means for three subtests (Draw-a-Man, Kraus-Weber and Angels-in-the-Snow) were not compared because scores for all children in the matched pairs were not available.

TABLE 19

t-Values of Pre test Means of Individual Subtests for 24 Matched Pairs of Unior Students Receiving Training And Students Receiving The Enrichment Program 1967 Kindergarten Class

Subtest	t
Simkov	-.24
Geometric Designs	0.0
Draw-A-Man	---[1]
Body Identification	1.83
Kraus-Weber	---[1]
Angels-in-the-Snow	---[1]
Padalino Clapping Patterns	0.0
Auditory Vocal Sequencing	-1.8
Auditory Vocal Association Test	.93

Note 1. Values not computed due to incomplete data.

T-tests were also computed to assess the improvement or relative gain between pre and post test scores for the 24 matched pairs. The results shown in Table 20 indicate that the children receiving training showed more growth at the .05 level of significance in the following subtests: Body Identification The Padalino Clapping Patterns, and The Auditory Vocal Association Test.

See Table 17.

TABLE 20

t-Values of Mean Improvement for 24 Matched Pairs of Union Students Receiving Training and Students Receiving the Enrichment Program 1967 Kindergarten Class

Subtest	t
Simkov	.82
Geometric Designs	.97
Draw-A-Man	---[1]
Body Identification	2.26*
Kraus-Weber	---[1]
Angels-in-the-Snow	---[1]
Padalino Clapping Patterns	2.70*
Auditory Vocal Sequencing	.35
Auditory Vocal Association Test	2.68*

* Significant at the .05 level.

Note 1. Values not computed due to incomplete data.

The Metropolitan Readiness Test

The Metropolitan Readiness Test was administered in Union by a psychometrist, who trained two perception teachers to administer them

in Summit. Both groups of children were tested in the Spring of 1968. T-tests were computed for the three primary groups of matched pairs on the following parts of the Metropolitan Reading Readiness Test: Copying, Reading Readiness Total Score (Tests 1-4), and on the Total Readiness Scores (Tests 1-6).

1. From Table 21, it may be seen that there were no significant differences between the Union Experimental Group I, who received the complete program of training, and the Control Group from Summit who received no training. (See Table 21).

TABLE 21

Means, SD's and t's on the Metropolitan Readiness Readiness Test for Experimental and Control Groups I.
1967 Kindergarten Class (N = 29)

	SUMMIT		UNION		
Subtest	Mean	SD	Mean	SD	t
Copying	4.93	2.93	5.39	3.16	-.57
Tests 1-4	49.13	12.62	46.14	9.86	.99
Tests 1-6	64.86	18.49	63.28	16.65	.33

2. Experimental Group II, (EP), those students from Union in the enrichment program, scored higher than the Control Group from Summit on Copying and on Total Readiness. Table 22 reveals these differences to be at the .05 level of significance.

TABLE 22

Means, SD's, and t's on the Metropolitan Reading Readiness Test for Experimental and Control Groups II.
1967 Kindergarten Class (N = 31)

	SUMMIT		UNION		
Subtest	Mean	SD	Mean	SD	t
Copying	7.00	2.39	8.59	1.34	3.27*
Tests 1-4	55.61	5.34	57.56	3.14	1.77
Tests 1-6	77.83	9.76	83.37	4.73	-2.87*

* Significant at the .01 level.

3. Table 23 contains the data for Experimental and Control Groups III, those receiving a full program of training and those receiving training in all areas except gross motor. There were no significant differences between Experimental and Control Groups III on the parts of the Metropolitan.

TABLE 23

Means, SD's, and t's on the Metropolitan Reading Readiness Test for Experimental and Control Groups III. 1967 Kindergarten Class (N = 26)

	SUMMIT		UNION		
Subtest	Mean	SD	Mean	SD	t
Copying	5.03	2.40	4.85	3.03	.24
Tests 1-4	47.19	8.04	47.00	8.21	.08
Tests 1-6	64.19	11.78	64.59	11.21	-.12

Since the Metropolitan Reading Readiness Test was administered only once, it was not possible to compare the improvement made by the sets of matched pairs. It is possible that this type of analysis might have yielded more significant differences.

The percentages of Union children falling within the lowest decile and the lowest quartile of the Metropolitan Readiness Test was computed for the kindergarten class of 1967 and for each of the preceding two years. No differences were found. However, more than half of the children falling within these percentiles had not been receiving intensive perceptual training.

Discussion

It is interesting to note that in no sub-test or area, including Reading Readiness, did the Summit or Union Control Groups indicate greater gain than the Union Experimental Groups. Moreover, in the Union population, the most impressive statistic (t = 9.16) was obtained from a comparison of growth made by all the Union children receiving training with the remainder of the Union kindergarten population.

All of these, while still not completely clear, seem to suggest that there are implications for perceptual training embracing the concepts of early diagnosis followed by diagnostic teaching.

Spring of 1969 Post Test Results for the Kindergarten Class of 1967

During the Spring of 1969, at the end of the first grade the same battery of tests was administered to Groups I II, and III of the matched pairs in Union and Summit. (Group IV was an a posteriori set of matched pairs. It was found that when they were first graders some of their teachers recommended them in the program. Thus, this group was dropped after the kindergarten year.) Training had continued for the children in the program during this second year of the project. The sizes of the samples dropped due to the usual attrition in school populations.

There were no significant differences between the groups in the general areas A, B, C, D, and T, (Tables 24-27) nor were there any significant differences on any of the nine variables. (See Tables 28 to 31). However, the children in Experimental Group I, those receiving the complete program, received a + score which was relatively close to significance on the Kraus-Weber ($t = 1.89$, significant at the .10 level). The Union children in Experimental Group II scored higher, though not significantly on The Padalino Clapping Patterns. These children had participated in an enrichment program during kindergarten but not in subsequent years. Due to the large numbers of children, the enrichment program was not continued for the 1967 kindergarten class after they entered first grade or for the 1968 kindergarten children.

TABLE 24

1969 Post Test Means, SD's, and t's of Area Scores for Experimental and Control Groups I. (N = 22)
1967 Kindergarten Class

	SUMMIT		UNION		
Area	Mean	SD	Mean	SD	t
A	64.59	9.24	59.27	16.35	1.32
B	62.90	15.74	61.04	11.18	.45
C	74.95	6.89	74.31	8.15	.27
D	68.50	7.34	69.81	9.57	-.51
T	68.13	6.95	67.68	7.18	.21

TABLE 25

1969 Post Test Means, SD's, and t's of Area Scores for Experimental and Control Groups II. (N = 24)
1967 Kindergarten Class

Area	SUMMIT Mean	SUMMIT SD	UNION Mean	UNION SD	t
A	72.41	10.36	73.37	11.72	-.30
B	70.08	15.01	68.95	9.81	.30
C	77.41	13.78	79.66	8.06	-.69
D	71.41	6.13	73.04	11.20	-.62
T	73.26	7.75	74.20	7.01	-.44

TABLE 26

1969 Post Test Means, SD's, and t's of Area Scores for Experimental and Control Groups III. (N = 19)
1967 Kindergarten Class

Area	Program Without Gross Motor Training Mean	Program Without Gross Motor Training SD	Complete Program Mean	Complete Program SD	t
A	61.26	11.87	61.94	8.70	-.20
B	58.21	13.27	60.21	10.26	-.51
C	71.94	10.08	69.94	8.14	.67
D	67.36	12.10	68.21	10.89	-.22
T	65.13	8.73	65.52	4.53	-.17

TABLE 27

1969 Post Test Means, SD's, and t's of Area Scores for Experimental and Control Groups IV. (N = 21)
1967 Kindergarten Class

Area	Union-Non Program Mean	Union-Non Program SD	Union-Program Mean	Union-Program SD	t
A	53.71	11.39	54.80	11.36	-.31
B	53.71	11.27	57.14	6.79	-1.05
C	68.09	9.63	69.19	7.94	-.40
D	63.38	10.29	66.61	8.08	-1.13
T	60.21	6.87	62.35	4.94	-1.15

TABLE 28

1969 Post Test Means, SD's and t's of Individual Subtests for Experimental and Control Groups I. (N = 22)
1967 Kindergarten Class

Subtests	SUMMIT Mean	SUMMIT SD	UNION Mean	UNION SD	t
Simkov	11.63	2.05	11.27	2.72	.49
Geometric Designs	3.27	.63	3.13	.71	.67
Draw-A-Man	18.04	4.46	18.50	6.27	-.27
Body Identification	1.90	.97	2.36	1.25	-1.34
Kraus-Weber	3.68	.47	3.22	1.02	1.89
Angels-in-the-Snow	1.45	.80	1.54	.91	-.35
Padalino Clapping Patterns	13.59	4.29	13.59	3.18	.00
Auditory Vocal Sequencing	23.13	6.08	22.04	4.55	.67
Auditory Vocal Association Test	16.09	2.15	17.90	2.58	.25

TABLE 29

1969 Post Test Means, SD's, and t 's of Individual Subtests for Experimental and Control Groups II. (N = 24)
1967 Kindergarten Class

Subtests	SUMMIT Mean	SUMMIT SD	UNION Mean	UNION SD	t
Simkov	12.79	1.69	12.54	2.28	.43
Geometric Designs	3.54	.58	3.70	.46	-1.08
Draw-A-Man	20.95	5.64	22.66	5.74	-1.03
Body Identification	2.37	1.24	2.83	1.23	-1.27
Kraus-Weber	3.79	.41	3.70	.69	.50
Angels-in-the-Snow	1.41	.82	1.62	.92	-.82
Padalino Clapping Patterns	14.62	3.37	16.12	1.56	-1.97
Auditory Vocal Sequencing	26.29	6.74	24.08	4.88	1.29
Auditory Vocal Association Test	18.87	4.43	19.87	2.17	-.99

TABLE 30

1969 Post Test Means, SD's and t's of Individual Subtests for Experimental and Control Groups III. (N = 19)
1967 Kindergarten Class

Subtests	Program Without Gross Motor Training Mean	SD	Complete Program Mean	SD	t
Simkov	10.36	2.77	11.10	2.40	-.87
Geometric Designs	3.21	.63	3.31	.82	-.44
Draw-A-Man	18.26	5.85	17.15	4.74	.63
Body Identification	2.26	1.28	2.78	1.08	-1.36
Kraus-Weber	3.26	.99	3.00	1.10	.77
Angels-in-the-Snow	1.42	.76	1.36	.76	.21
Padalino Clapping Patterns	13.00	4.18	14.63	2.67	-1.43
Auditory Vocal Sequencing	21.00	5.20	20.52	4.55	.29
Auditory Vocal Association Test	17.15	3.21	16.52	2.56	.66

TABLE 31

1969 Post Test Means, SD's, and t's of Individual Subtests for Experimental and Control Groups IV. (N = 21)
1967 Kindergarten Class

Subtests	Union Program Mean	SD	Union Program Mean	SD	t
Simkov	9.28	2.84	9.76	2.25	-.60
Geometric Designs	3.04	.74	2.76	.70	1.28
Draw-A-Man	15.28	3.57	15.57	4.85	-.21
Body Identification	2.00	1.18	2.00	1.13	00
Kraus-Weber	3.50	.82	3.57	.81	-.27
Angels-in-the-Snow	1.00	.00	1.00	.00	.00
Padalino Clapping Patterns	12.00	3.93	13.52	3.60	-1.30
Auditory Vocal Sequencing	19.47	4.24	19.85	4.49	-.28
Auditory Vocal Association Test	15.95	3.07	16.28	2.51	-.38

The 1969 growth scores (located in Table 32, from the Spring of 1968 to the Spring of 1969) indicated that the Summit children in Control Group I, who received no training, improved significantly on the Kraus-Weber ($t = 2.26$) and manifested improvement close to significance on the Simkov ($t = 1.96$, significant at the .10 level). There were no significant differences shown in Table 33 in growth scores between Experimental and Control Groups II. However, whereas the Union children in Group II seemed to manifest greater improvement on the Draw-a-Man Test ($t = 1.80$) the Summit children again showed more growth on the Simkov ($t = 1.87$). There were no significant differences indicated in Table 34 for the 1969 improvement index between the experimental and control children in Group III. However, the children who did not have gross motor training scored higher in Angels-in-the-Snow, ($t = 2.02$, significant at the .10 level).

The fact that there were practically no significant differences between the various sets of matched pairs, but that the control groups manifested relatively more improvement in some areas may be accounted for in several ways.

1. Perhaps because of the perceptual training the Union children in the Experimental Groups matured earlier in visual motor integration and in certain aspects of gross motor development. However, the youngsters in the Control Groups might have "caught up" to them in the course of normal maturation by the end of first grade.

2. At the beginning of first grade, the children in the Summit schools were placed in classes of 15. They were also given training in audition by a specialist, and physical education which is not part of Union curriculum prior to third grade. Moreover, the first grade teachers in Summit regrouped their children during various time slots so that one of them would be available to work intensively with those children manifesting reading problems.

3. It must also be remembered that the tests were administered to the children for the third time and the effect of practice on some of these measures may be considerable.

In view of this type of curriculum in Summit, the 1969 test results were not surprising. What proved to be interesting, however, were the 1970 test findings.

TABLE 32

Means, SD's, and t's in 1969 Improvement Indices on Individual Subtests for Experimental and Control Groups 1. (N = 22)
1967 Kindergarten Class

	SUMMIT		UNION		
Subtests	Mean	SD	Mean	SD	t
Simkov	3.59	2.30	2.27	2.14	1.96
Geometric Designs	.50	1.26	.27	.88	.69
Draw-A-Man	2.81	4.42	5.04	7.23	-1.23
Body Identification	.54	1.10	.04	1.46	1.28
Kraus-Weber	.45	1.14	-.36	1.25	2.26*
Angels-in-the-Snow	.09	1.06	.04	1.25	.12
Padalino Clapping Patterns	3.90	4.03	4.00	4.63	-.06
Auditory Vocal Sequencing	3.77	3.08	2.90	4.49	.74
Auditory Vocal Association Test	4.31	4.24	4.45	4.09	-.10

* Significant at the .05 level.

TABLE 33

Means, SD's, and t's in 1969 Improvement Indices on Individual Subtests for Experimental and Control Groups II. (N = 24)
1967 Kindergarten Class

	SUMMIT		UNION		
Subtests	Mean	SD	Mean	SD	t
Simkov	2.58	3.07	.79	3.52	1.87
Geometric Designs	.29	.85	.16	.76	.53
Draw-A-Man	3.62	3.34	6.12	5.88	-1.80
Body Identification	.16	.91	.54	1.41	-1.09
Kraus-Weber	.16	.81	.04	.62	.59
Angels-in-the-Snow	-.04	1.19	-.08	1.10	.12
Padalino Clapping Patterns	3.37	3.35	4.20	3.53	-.83
Auditory Vocal Sequencing	2.25	3.66	2.00	3.62	.23
Auditory Vocal Association Test	2.29	3.74	3.62	3.04	-1.35

TABLE 34

Means, SD's, and t's in 1969 Improvement Indices on Individual Subtests for Experimental and Control Groups III. (N = 19)
1967 Kindergarten Class

	Program Without Gross Motor Training		Complete Program		
Subtests	Mean	SD	Mean	SD	t
Simkov	2.89	3.07	1.84	2.26	1.20
Geometric Designs	.52	.96	.63	1.38	-.27
Draw-A-Man	5.57	5.87	3.10	5.56	1.33
Body Identification	.05	1.26	.63	1.30	-1.38
Kraus-Weber	.26	1.28	.10	1.28	.37
Angels-in-the-Snow	.15	.83	-.47	1.07	2.02
Padalino Clapping Patterns	4.52	3.83	4.36	3.02	.14
Auditory Vocal Sequencing	1.42	3.57	2.73	2.20	-1.32
Auditory Vocal Association Test	4.94	3.65	4.21	3.56	.62

Spring of 1967 Post Test Results for the Kindergarten Class of 19

During the academic year 1969 to 1970 the children were second graders. In the Summit schools, the class size for these children was still 15, whereas in Union classes averaged 24. Group I (Union-complete program and Summit-no training) consisted of 17 matched pairs by the spring of that year. When they were retested it was found, as shown in Table 35, that the Union Experimental Group scored relatively higher on Draw-a-Man (t = 1.82), whereas the Control Group tested relatively higher on Angels-in-the-Snow (t = 1.78). Tables 36 and 37 contain means, standard deviations, and t's on the individual subtests for Groups II and III. The growth scores for that year (1969-1970) showed in Table 38 that the Experimental Group improved significantly on the Simkov (t = 3.03) and on the Auditory Vocal Sequencing Test (t = 2.30). They also manifested relatively more growth on Draw-a-Man (t = -1.80). The Control children in Group II showed significantly more growth in Table 39 on the four geometric designs than did the Union children (t = 2.81). However, inspection of the average gain shows that the groups actually scored lower in the post testing, with the Summit group losing a little less than the Union children. By this time the number of children in Group III (GM-NGM) had dwindled to 14. The group with gross motor training made near significant gains on the Kraus-Weber (t = -2.12). (See Table 40).

TABLE 35

1970 Post Test Means, SD's, and t's of Individual Subtests for Experimental and Control Groups I. (N = 17)
1967 Kindergarten Class

	SUMMIT		UNION		
Subtests	Mean	SD	Mean	SD	t
Simkov	12.38	2.08	13.11	1.72	-1.16
Geometric Designs	2.88	.78	2.88	.85	0.00
Draw-A-Man	19.00	3.84	22.29	6.39	-1.82
Body Identification	2.00	1.27	2.76	1.39	-1.66
Kraus-Weber	3.82	.39	3.58	.79	1.09
Angels-in-the-Snow	1.82	1.01	1.29	.68	1.78
Padalino Clapping Patterns	14.82	3.48	15.05	2.53	-.22
Auditory Vocal Sequencing	24.82	5.32	26.41	4.91	-.90
Auditory Vocal Association Test	20.58	2.12	20.76	1.78	-.26

TABLE 36

1970 Post Test Means, SD's, and t's of Individual Subtests for Experimental and Control Groups II. (N = 21)
1967 Kindergarten Class

Subtests	SUMMIT Mean	SUMMIT SD	UNION Mean	UNION SD	t
Simkov	13.66	1.77	13.52	1.47	.28
Geometric Designs	3.38	.49	3.00	.54	2.35*
Draw-A-Man	23.76	5.29	27.52	7.01	-1.96
Body Identification	3.19	1.20	3.23	.99	-.13
Kraus-Weber	3.66	.79	3.71	.46	-.23
Angels-in-the-Snow	2.14	1.15	2.52	.81	-1.23
Padalino Clapping Patterns	15.47	3.47	16.76	1.22	-1.60
Auditory Vocal Sequencing	29.00	6.24	28.66	5.44	.18
Auditory Vocal Association Test	22.33	2.00	21.95	1.90	.62

* Significant at the .05 level of significance.

TABLE 37

1970 Post Test Means, SD's, and t's of Individual Subtests for Experimental and Control Groups III. (N = 14)
1967 Kindergarten Class

Subtest	Program Without Gross Motor Training Mean	Program Without Gross Motor Training SD	Complete Program Mean	Complete Program SD	t
Simkov	13.14	.86	12.78	1.47	.78
Geometric Designs	3.28	.61	2.92	.61	1.54
Draw-A-Man	22.21	6.45	20.57	6.19	.68
Body Identification	2.64	1.33	2.78	1.25	-.29
Kraus-Weber	3.42	.93	3.57	.51	-.49
Angels-in-the-Snow	2.00	1.03	2.07	1.14	-.17
Padalino Clapping Patterns	15.35	2.40	15.92	1.81	-.70
Auditory Vocal Sequencing	26.42	7.40	23.07	4.41	1.45
Auditory Vocal Association Test	19.92	1.85	18.85	3.46	1.02

TABLE 38

Means, SD's, and t's for Differences in 1970 Improvement Indices on Individual Subtests for Experimental and Control Groups I. (N = 17)
1967 Kindergarten Class

Subtests	SUMMIT		UNION		
	Mean	SD	Mean	SD	t
Simkov	.35	1.93	2.35	1.90	-3.03*
Geometric Designs	-.52	.94	-.17	.95	-1.08
Draw-A-Man	.58	5.24	4.11	6.14	-1.80
Body Identification	.23	.75	.11	.85	.42
Kraus-Weber	.11	.69	.23	1.09	-.37
Angels-in-the-Snow	.29	1.40	-.17	.88	1.17
Padalino Clapping Patterns	1.47	3.84	1.47	2.45	.00
Auditory Vocal Sequencing	1.35	2.82	4.00	3.79	-2.30*
Auditory Vocal Association Test	2.58	2.98	2.82	1.70	-.28

* Significant at the .05 level.

TABLE 39

Means, SD's, and t's for Differences in 1970 Improvement Indices on Individual Subtests for Experimental and Control Groups II. (N = 21)
1967 Kindergarten Class

Subtests	SUMMIT		UNION		
	Mean	SD	Mean	SD	t
Simkov	1.00	2.02	.66	2.12	.51
Geometric Designs	-.14	.85	-.76	.53	2.81*
Draw-A-Man	2.23	5.53	4.33	7.57	-1.02
Body Identification	.76	1.26	.33	1.31	1.07
Kraus-Weber	-.09	.76	.00	.63	-.43
Angels-in-the-Snow	.66	1.19	.90	1.30	-.61
Padalino Clapping Patterns	1.09	2.30	.57	1.39	.89
Auditory Vocal Sequencing	2.95	3.26	4.52	4.53	-1.28
Auditory Vocal Association Test	3.23	3.03	1.95	2.10	1.59

* Significant at the .05 level.

TABLE 40

Means, SD's, and t's for Differences in 1970 Improvement Indices on Individual Subtests for Experimental and Control Groups III. (N = 14)
1967 Kindergarten Class

	Program Without Gross Motor		Complete Program		
Subtests	Mean	SD	Mean	SD	t
Simkov	2.42	3.15	2.07	2.43	.33
Geometric Designs	.00	.87	-.21	1.12	.56
Draw-A-Man	3.07	7.16	2.35	5.07	.30
Body Identification	.28	.61	.14	1.46	.33
Kraus-Weber	-.14	.66	.64	1.21	-2.12
Angels-in-the-Snow	.57	.85	.71	1.20	-.36
Padalino Clapping Patterns	1.92	2.52	1.57	2.17	.40
Auditory Vocal Sequencing	4.42	5.44	1.92	2.89	1.51
Auditory Vocal Association Test	2.14	2.85	2.21	3.04	-.06

It is interesting to note the spurt in growth for the Union children receiving training during their third year of the program. Again, the gains were in the areas of visual motor integration, as they had been during the kindergarten year. This time there was also significantly more growth in auditory sequencing. Post testing also suggested higher scores in certain areas of Gross Motor Orientation. This had also occurred during the first year of the program. (See Tables 13 and 15.)

Comparison of the 1969 and 1970 gains for the respective groups reveals that the gains were generally smaller by the end of the second grade. For example, reference to Tables 32 and 38 reveals that the Summit group had average gains in Simkov of 3.59 and .35 for 1969 and 1970, respectively. The standard deviation of the gains also decreased by the second grade. Inspection of all these later tables must be performed with the realization that the tests have been administered to these children four times and that what was appropriate for testing pre-kindergarten children may now be too easy for children at the end of second grade. The means on all four testings have been included in Table 41 to facilitate a review of these data. The increases in scores across the years for each group, must also be viewed in light of the decreasing sizes of the groups. The N's dropped from 28 to 17, 31 to 21, and 26 to 14 for Groups I, II, and III, respectively.

In Table 42, the various t-values for the 1968, 1969, and 1970 improvement indices are summarized for the individual subtests of the Experimental

TABLE 41

Summary of Means and N's for Individual Subtests of Experimental and Control Groups I, II, and III in 1967 Pre test and Posttests in 1968, 1969, and 1970

Subtests I - Control Group-Summit-No Training (S-NT) and Experimental Group Union-Full Program (U-FP)

	1967 (N = 28)		1968 (N = 28)		1969 (N = 22)		1970 (N = 17)	
	S-NT	U-FP	S-NT	U-FP	S-NT	U-FP	S-NT	U-FP
Simkov	2.17	1.92	7.31	8.32	11.63	11.27	12.35	13.11
Geometric Designs	1.67	1.44	2.48	2.92	3.27	3.13	2.88	2.88
Draw-A-Man	9.87	8.76	14.34	13.92	18.04	18.50	19.00	22.29
Body Identification	1.20	1.25	1.41	2.17*	1.90	2.36	2.00	2.76
Kraus-Weber	2.79	2.39	3.17	3.42	3.68	3.22	3.82	3.58
Angels-in-the-Snow	1.41	1.17	1.31	1.53	1.45	1.54	1.82	1.29
Padalino Clapping Patterns	2.60	2.67	10.06	9.21	13.59	13.59	14.82	15.05
Auditory Vocal Sequencing	17.82	17.25	19.55	18.96	23.13	22.04	24.82	26.41
Auditory Vocal Association Test	6.78	6.67	13.58	12.50	18.09	17.90	20.58	20.76

Subtests II - Control Group-Summit-No Training (S-NT) and Experimental Group Union-Enrichment Program (U-EP)

	1967 (N = 31)		1968 (N = 31)		1969 (N = 24)		1970 (N = 21)	
	S-NT	U-EP	S-NT	U-EP	S-NT	U-EP	S-NT	U-EP
Simkov	6.61	7.00	10.32	11.65*	12.79	12.54	13.66	13.52
Geometric Designs	2.93	2.51	3.29	3.46	3.54	3.70	3.38	3.00*
Draw-A-Man	14.62	13.78	16.87	17.18	20.95	22.66	23.76	27.52
Body Identification	1.35	1.45	2.09	2.31	2.37	2.83	3.19	3.23
Kraus-Weber	3.50	3.30	3.64	3.71	3.79	3.70	3.66	3.71
Angels-in-the-Snow	1.56	1.60	1.48	1.62	1.41	1.62	2.14	2.52
Padalino Clapping Patterns	5.13	4.76	11.96	11.84	14.62	16.12	15.47	16.76
Auditory Vocal Sequencing	22.27	21.00	23.45	22.25	26.29	24.08	29.00	28.66
Auditory Vocal Association Test	10.72	11.41	16.51	16.40	18.87	19.87	22.33	21.95

TABLE 41 (Continued)

Subtests III - Control Group-Union-Full Program except Gross Motor (U-NGM) and Experimental Group-Union-Full Program (U-FP)

	1967 (N = 26)		1968 (N = 26)		1969 (N = 19)		1970 (N = 14)	
	U-NGM	U-FP	U-NGM	U-FP	U-NGM	U-FP	U-NGM	U-FP
Simkov	1.73	1.76	8.07	8.69	10.36	11.10	13.14	12.78
Geometric Designs	1.30	1.53	2.92	2.76	3.21	3.31	3.28	2.92
Draw-A-Man	8.66	8.25	12.33	14.65*	18.26	17.15	22.21	20.57
Body Identification	1.07	1.00	2.29	2.11	2.26	2.78	2.64	2.78
Kraus-Weber	2.24	2.39	2.96	3.00	3.26	3.00	3.42	3.57
Angels-in-the-Snow	1.16	1.20	1.37	1.76	1.42	1.36	2.00	2.07
Padalino Clapping Patterns	2.57	2.50	9.22	10.84	13.00	14.63	15.35	15.92
Auditory Vocal Sequencing	15.88	16.23	19.70	18.38	21.00	20.52	26.42	23.07
Auditory Vocal Association Test	5.84	6.07	12.22	12.23	17.15	16.52	19.91	18.85

* Difference between the means significant at the .05 level.

TABLE 42

Summary of t's for 1968, 1969, and 1970 Improvement Indices on Individual Subtests of Experimental and Control Groups I, II, and III.
1967 Kindergarten Class

	Groups I-t's			Groups II - t's			Groups III - t's		
Subtests	1968	1969	1970	1968	1969	1970	1968	1969	1970
Simkov	-2.57*	1.96	-3.03*	-1.01	1.87	.51	2.03	1.20	.33
Geometric Designs	-2.03	.69	-1.08	-2.09*	.53	2.81*	.27	-.27	.56
Draw-A-Man	-.09	-1.23	-1.80	-.63	-1.80	-1.02	-1.82	1.33	.30
Body Identification	-2.50*	1.28	.42	.20	-1.09	1.07	.11	-1.38	.33
Kraus-Weber	-.80	2.26*	-.37	-.52	.59	-.43	-.74	.37	-2.12
Angels-in-the-Snow	-1.62	.12	1.17	-.57	.12	-.61	-1.37	2.02	-.36
Padalino Clapping Patterns	.46	-.06	0	.35	-.83	.89	-1.67	.14	.40
Auditory Vocal Sequencing	-.30	.74	-2.30*	.35	.23	-1.28	1.93	-1.36	1.51
Auditory Vocal Association Test	1.16	-.10	-.28	.05	-1.35	1.59	-.29	.62	-.06
N	28	22	17	31	24	21	27	19	14

Note 1. Negative values for t indicates higher means for the experimental group.

* Significant at the .05 level.

and Control Groups I, II, and III. It may be seen that the most significant improvement took place in Experimental Group I, the Union students in the full program. While significant improvement occurred in the Simkov and Body Identification subtests during the first year, they improved more than the control group in seven of the nine subtests. During first grade the controls improved more but during the second grade, the third year of training, the experimental group again indicated a spurt showing greater improvement in six of the nine subtests, two (Simkov and Auditory and Vocal Sequencing) significantly so.

In comparing improvement indices for Experimental and Control Groups II, neither group showed any advantage. Since these children were not identified as having problems and did not receive training, significant improvement trends might have indicated differences in the curricula of the respective school systems. The lack of such improvement strengthened the interpretation of improvement in Experimental Group as resulting from the training program.

The t-values of Experimental and Control Groups III indicated no significant improvement for either group. Both sets of children were from Union and both received training except that the Control Group did not receive formal training in the gross motor area. The lack of significant improvement raises questions as to the interaction between type of training and type of deficit, and to the carry over into other areas of the various types of perceptual training. However, one should keep in mind that the non-Gross Motor Group received more training in the other modalities because gross motor activities were deleted from their half-hour sessions. Subjectively, the perception teachers noticed that the children receiving gross motor training appeared to be better coordinated than did the youngsters in the non-gross motor group.

Statistical Findings for the Incoming Kindergarten Class of 1968

It goes without saying that educational research presents problems because of the many variables involved. As might be expected, because of the emphasis placed on perceptual training during the past six years or so, many school systems have incorporated some phase of such training in their curricula. Thus, it was not surprising to find that Hillside had implemented the Winter Haven Program. In fact, some of the children in the Hawthorne Control Group had used the walking board daily during their kindergarten year. Moreover, when the Hillside youngsters entered first grade in 1969, a new program was initiated to remediate learning disabilities. Nevertheless, the Experimental and Control Groups were maintained and post tested.

Because of the number of children involved with two grade levels in the program, it was not possible to post test the entire kindergarten population in Hillside and Union in the springs of 1969 and 1970. Therefore, information relative to the growth of the general kindergarten populations is not available.

The pre test frequency distributions of areas A, B, C, D, and T are shown in graphs 8 through 12, respectively.

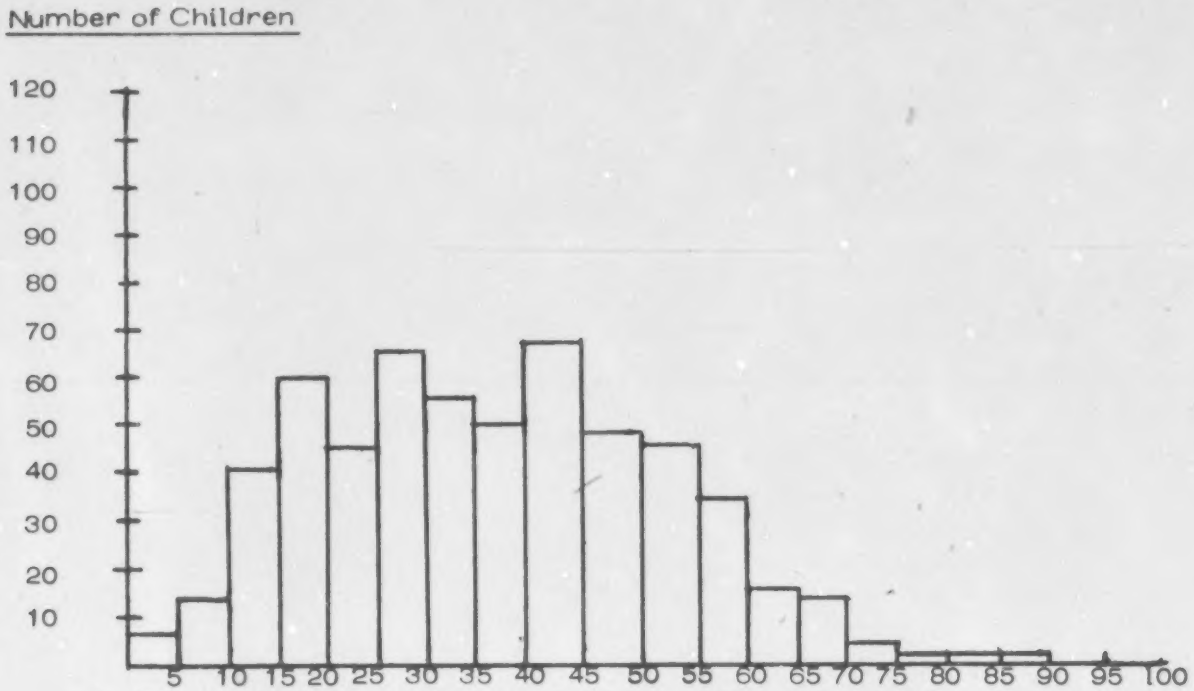


Figure 8. Histogram describing the distribution of scores in Area A- Perceptual Motor Match for the kindergarten class of 1968.

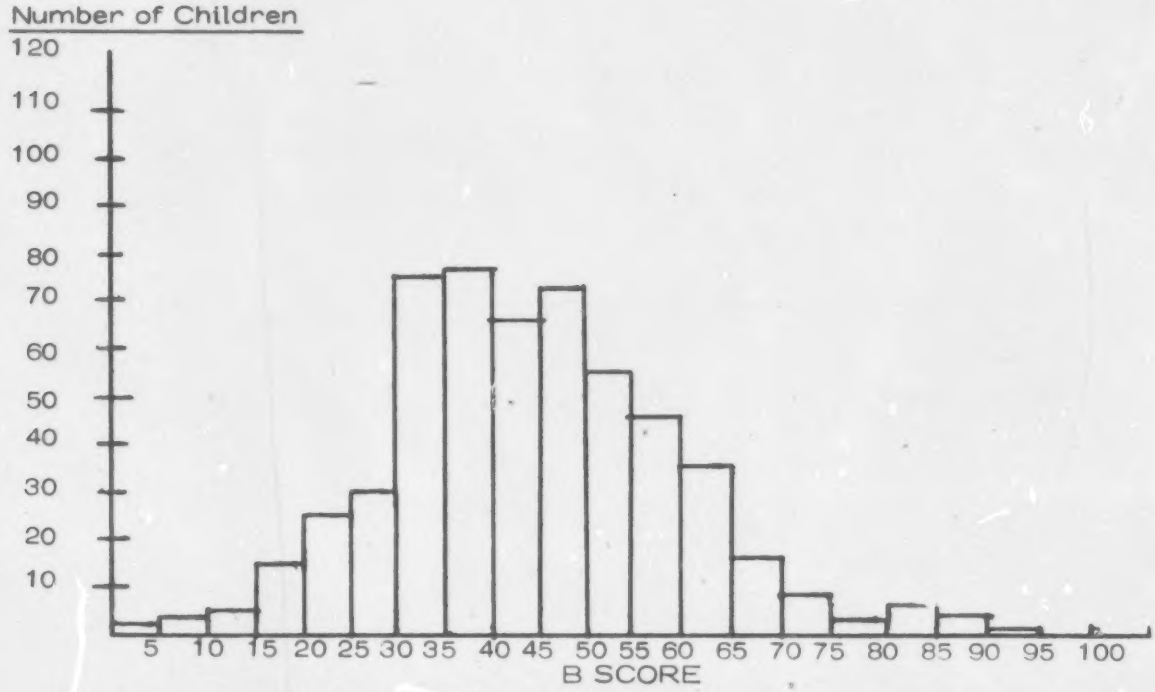


Figure 9. Histogram describing the distribution of scores in Area B- Auditory Dynamics for the kindergarten class of 1968.

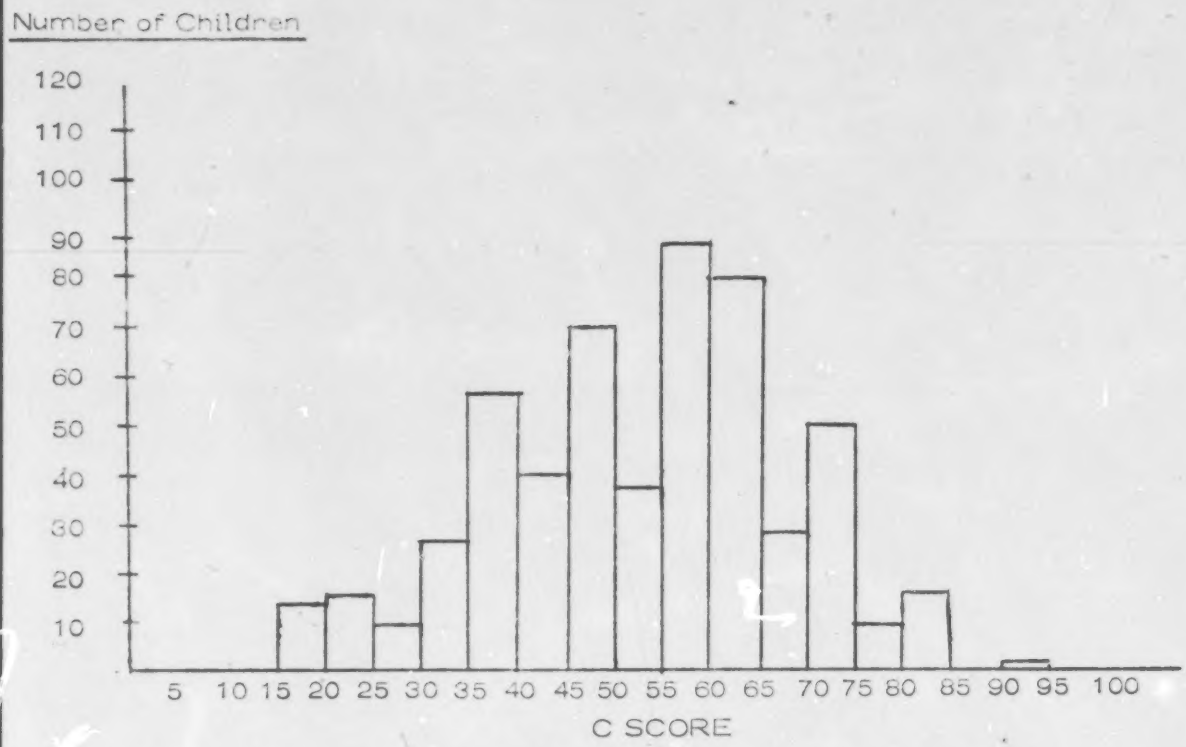


Figure 10. Histogram showing the distribution of scores in Area C- Concept Formation for the kindergarten class of 1968.

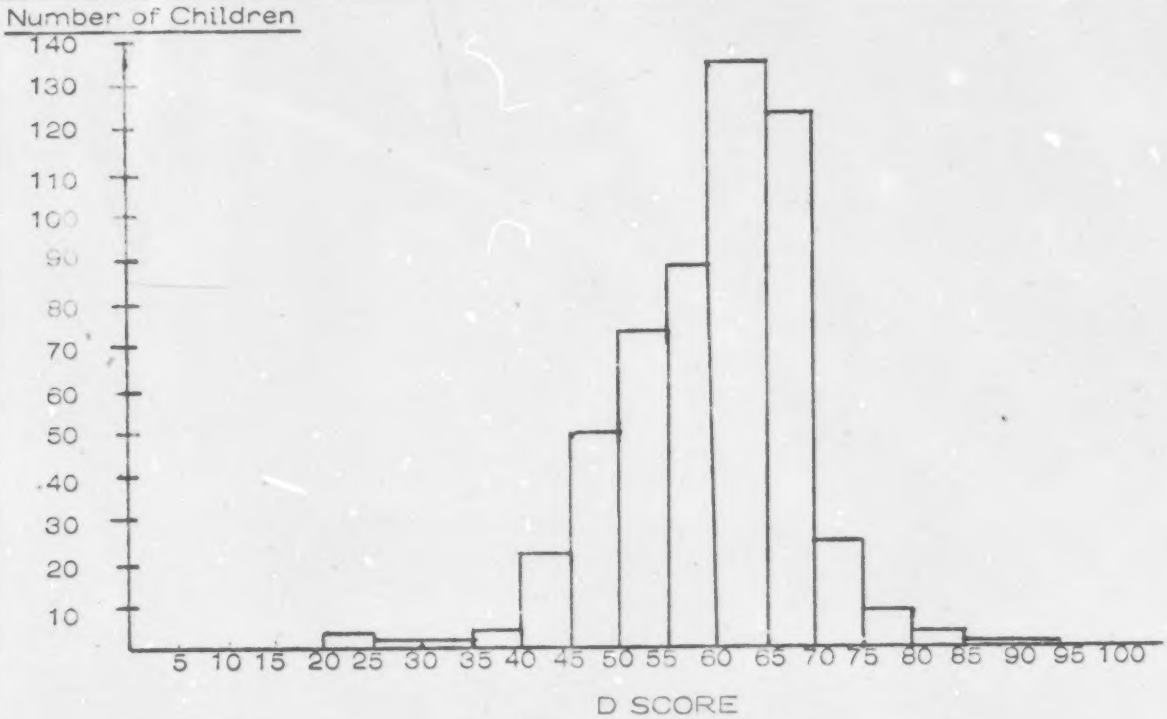


Figure 11. Histogram showing the distribution of scores in Area D- Gross Motor Orientation for the kindergarten class of 1968.

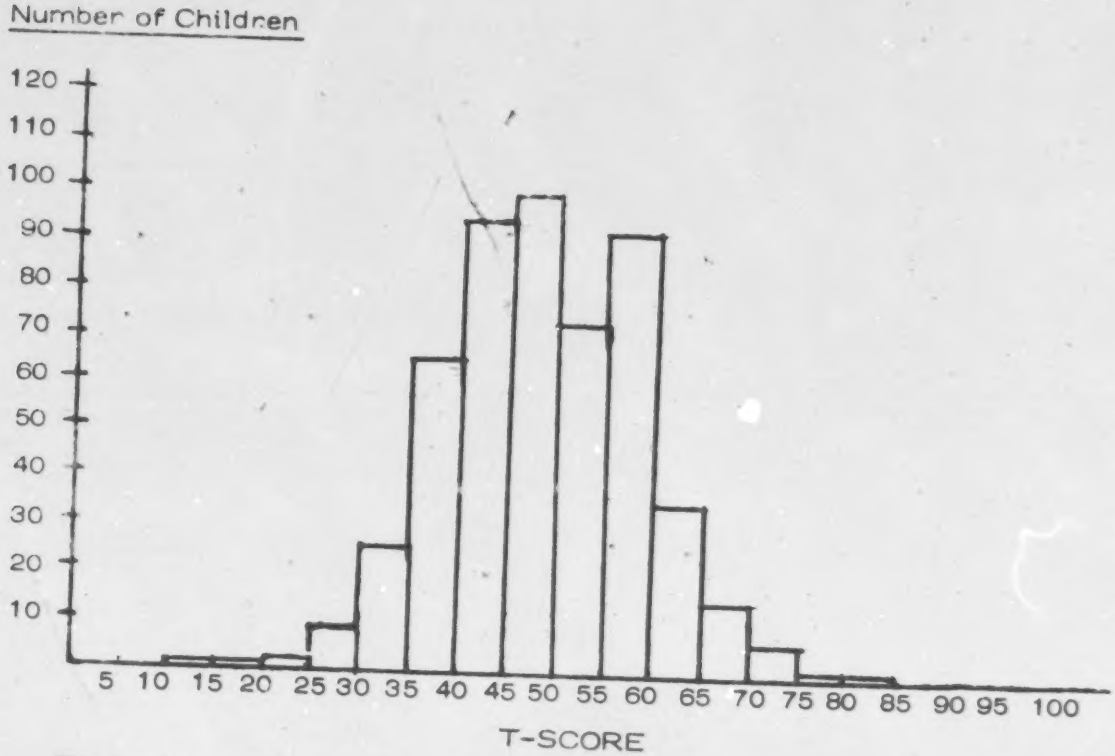


Figure 12. Histogram describing the distribution of Total Scores for the kindergarten class of 1968.

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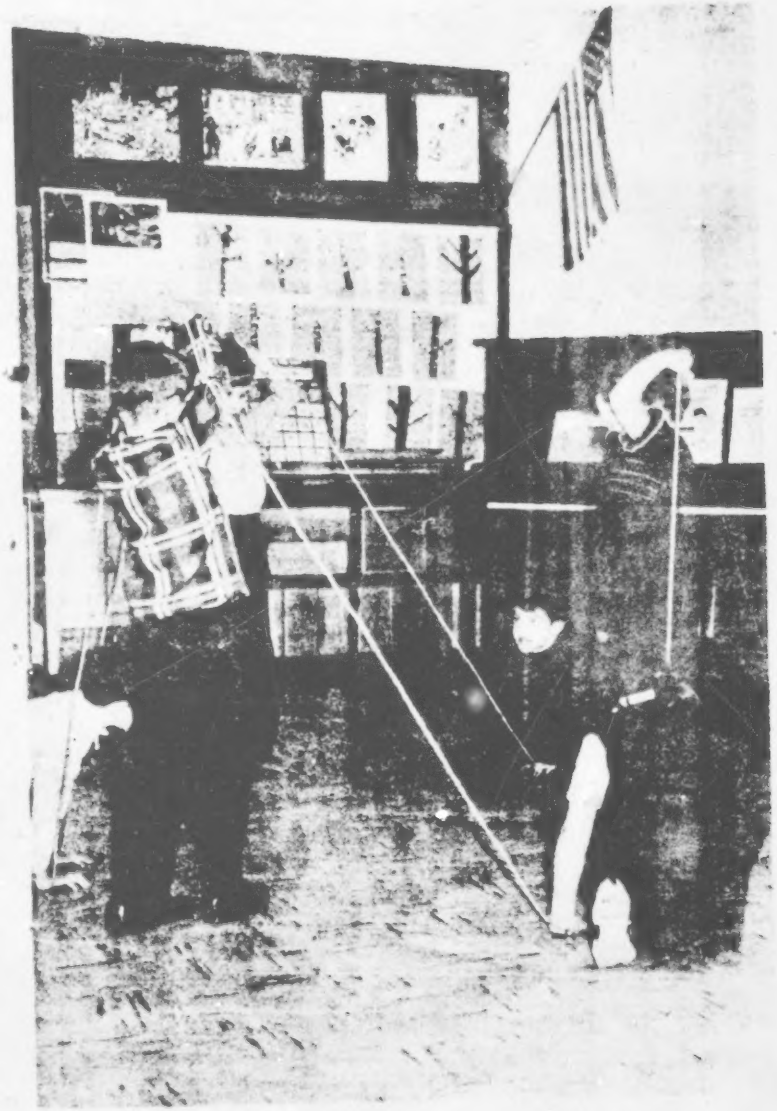

Use of the German Stretch Rope to Exercise Upper Torso and to Develop the Concepts of Up and Down

Data Relevant to the Kindergarten Year 1968-69

Pre test means, standard deviations, and t-values for the areas A, B, C, D, and T are listed in Tables 43 through 46 for the previously described experimental and control groups I through IV, respectively. No significant differences in pre test data were found.

TABLE 43

Pre-Test Means, SD's, and t's in Areas A, B, C, D and Total Score for Experimental and Control Groups I. 1968 Kindergarten Class (N = 24)

	Union - FP		Hillside - NT		
Area	Mean	SD	Mean	SD	t
A	24.50	9.60	23.41	9.38	.39
B	35.50	11.18	34.83	9.71	.22
C	36.91	10.98	38.08	11.97	-.35
D	56.62	6.69	57.08	8.10	-.21
T	38.84	5.23	38.81	5.07	.01

TABLE 44

Pre-Test Means, SD's, and t's in Areas A, B, C, D and Total Score for Experimental and Control Groups II. 1968 Kindergarten Class (N = 32)

	Union - NT		Hillside - NT		
Area	Mean	SD	Mean	SD	t
A	40.62	11.61	39.12	13.16	.48
B	48.75	8.62	49.40	10.67	-.27
C	48.71	11.37	49.31	11.74	-.20
D	63.28	5.93	63.09	8.09	.10
T	50.81	5.68	50.72	5.94	.05

TABLE 45

Pre-Test Means, SD's, and t's in Areas A, B, C, D and Total Score for Experimental and Control Groups III. 1968 Kindergarten Class (N = 20)

	Union - FP		Hawthorne Control		
Area	Mean	SD	Mean	SD	t
A	22.55	11.61	21.25	12.54	.34
B	36.70	12.20	37.40	12.87	-.17
C	36.30	12.49	38.35	13.88	-.49
D	53.63	6.73	53.63	7.94	0.00
T	37.52	6.35	37.97	7.86	-.19

TABLE 46

* NOTE: This data was not available for Group IV at the time of publication.

The pre test means, standard deviations, and t-values for the nine individual subtests are presented in Tables 47 through 50. There were no significant differences excepting for Group II (samplings of the two populations, neither of which had training.) As indicated in Table 48, the Hillside Control Group had significantly higher scores on Auditory Sequencing.

TABLE 47

Pre Test Means, SD's, and t's on Individual Subtests for Experimental and Control Groups I. 1968 Kindergarten Class (N = 24)

	Union - FP		Hillside - NT		
Subtests	Mean	SD	Mean	SD	t
Simkov	3.16	2.44	2.87	2.02	.44
Geometric Designs	1.70	.90	1.41	.77	1.19
Draw-A-Man	8.50	3.37	8.83	3.44	-.33
Body Identification	1.12	.44	1.17	.65	-.30
Kraus-Weber	2.83	1.16	2.86	1.21	-.10
*Angels-in-the-Snow	-	-	-	-	-
Padalino Clapping Patterns	5.29	3.96	3.45	3.03	1.79
Auditory Vocal Sequencing	15.62	4.03	17.04	4.91	-1.09
Auditory Vocal Association Test	9.95	3.54	10.33	3.79	-.35

* Data missing because of technical problems in data processing.

TABLE 48

Pre Test Means, SD's, and t's on Individual Subtests for Experimental and Control Groups II.
1968 Kindergarten Class (N = 32)

Subtests	Union - NT		Hillside - NT		
	Mean	SD	Mean	SD	t
Simkov	6.59	2.38	6.06	3.19	.75
Geometric Designs	2.37	1.15	2.25	.95	.47
Draw-A-Man	12.32	4.01	12.50	3.55	-.18
Body Identification	1.37	.79	1.28	.72	.49
Kraus-Weber	3.62	.65	3.46	.76	.87
Angels-in-the-Snow	1.15	.51	1.18	.47	-.25
Padalino Clapping Patterns	8.71	4.59	6.90	3.62	1.75
Auditory Vocal Sequencing	19.81	3.78	22.06	4.67	-2.11*
Auditory Vocal Association Test	13.71	3.64	13.90	3.75	-.20

* Significant at the .05 level.

TABLE 49

Pre Test Means, SD's, and t's on Individual Subtests for Experimental and Control Groups III.
1968 Kindergarten Class (N = 20)

Subtests	Union - FP		Hawthorne Control		
	Mean	SD	Mean	SD	t
Simkov	3.10	2.42	2.65	2.62	.56
Geometric Designs	1.35	.87	1.30	.80	.18
Draw-A-Man	7.95	3.64	7.90	4.78	.03
Body Identification	1.00	0.00	1.05	.22	-.99
Kraus-Weber	2.78	1.08	2.52	1.21	.70
*Angels-in-the-Snow	--	--	--	--	--
Padalino Clapping Patterns	4.10	3.64	4.75	3.33	-.58
Auditory Vocal Sequencing	17.40	4.42	17.20	5.06	.13
Auditory Vocal Association Test	9.75	4.01	10.45	4.45	-.52

TABLE 50

NOTE: This data was not available for Group IV at the time of publication.

Post Tests 1969

Tables 51 through 54 contain the 1969 post test data for the 1968 class. On the 1969 post tests of areas A, B, C, D and T, Union Experimental Groups I, II, and III tested significantly higher at the .05 or .01 levels in Area D, Gross Motor Orientation. The Union Experimental Group I which received the complete program also tested significantly higher at the .05 level in Area A, Visual Motor Match.

TABLE 51

1969 Post Test Means, SD's, and t's in Areas A, B, C, D, and Total Score for Experimental and Control Groups I.
1968 Kindergarten Class (N = 24)

	Union - FP		Hillside - NT		
Area	Mean	SD	Mean	SD	t
A	55.87	8.36	49.54	9.56	2.44*
B	52.29	9.09	57.54	15.01	-1.46
C	68.16	8.89	66.66	9.56	.56
D	66.70	7.08	58.08	9.18	3.64**
T	61.20	5.64	58.45	7.13	1.48

* Significant at the .05 level.

** Significant at the .01 level.

TABLE 52

1969 Post Test Means, SD's, and t's in Areas A, B, C, D, and Total Score for Experimental and Control Groups II.
1968 Kindergarten Class (N = 32)

	Union - NT		Hillside - NT		
Area	Mean	SD	Mean	SD	t
A	59.15	11.28	57.15	11.05	.71
B	63.19	10.36	66.18	10.95	-1.11
C	72.68	7.64	72.53	10.15	.06
D	69.06	11.17	62.21	7.38	2.89**
T	66.50	6.57	65.00	6.26	.93

** Significant at the .01 level.

TABLE 53

1969 Post Test Means, SD's, and t's in Areas A, B, C, D and Total Score for Experimental and Control Groups III. 1968 Kindergarten Class (N = 20)

	Union - FP		Hawthorne Control		
Area	Mean	SD	Mean	SD	t
A	53.10	12.04	48.50	10.27	1.29
B	55.75	10.93	54.80	12.68	.25
C	68.75	9.96	67.70	13.76	.27
D	66.90	10.81	58.00	6.96	3.09**
T	61.51	5.86	57.67	8.44	1.67

** Significant at the .01 level.

TABLE 54

NOTE: This data was not available for Group IV at the time of publication.

The means, standard deviations, and t values on individual subtests for the 1969 post tests of the Experimental and Control Groups I through IV are presented in Tables 55 through 58, respectively. Significantly higher means on the Simkov, Kraus-Weber, and Body Identification are shown in Table 55 for Union students receiving the complete program.

The sample of Union students not receiving training, Union Experimental Group II, also tested significantly higher at the .05 level on the Kraus-Weber. (See Table 56).

Examination of Table 57 reveals that a group receiving training, the Union Experimental Group III, received significantly higher scores than the Hawthorne Control in Geometric Designs and Body Identification.

Group IV had been reduced to a group of 16 by this time. Nevertheless, as shown in Table 58, the Union Experimental Group which received training had significantly higher scores in Auditory Vocal Association and in Tests 1-4 on the Metropolitan than did the Union Control Group which received no training.

TABLE 55

1969 Post Test Means, SD's, and t's in Individual Subtests
for Experimental and Control Groups I.
1968 Kindergarten Class (N = 24)

	Union - FP		Hillside - NT		
Subtests	Mean	SD	Mean	SD	t
Simkov	10.41	1.90	9.08	2.26	2.20*
Geometric Designs	2.75	.73	2.70	.69	.20
Draw-A-Man	15.20	3.36	13.29	4.00	1.79
Body Identification	2.16	1.20	1.50	.83	2.23*
Kraus-Weber	3.62	.71	2.66	1.27	3.21**
Angels-in-the-Snow	1.04	.20	1.00	0.00	.99
Padalino Clapping Patterns	11.70	3.89	13.12	3.88	-1.26
Auditory Vocal Sequencing	18.83	3.84	20.58	6.64	-1.11
Auditory Vocal Association Test	15.95	2.85	15.50	3.06	.53

TABLE 56

1969 Post Test Means, SD's, and t's in Individual Subtests
for Experimental and Control Groups II.
1968 Kindergarten Class (N = 32)

Subtests	Union - NT		Hillside - NT		
	Mean	SD	Mean	SD	t
Simkov	10.18	2.20	10.37	2.05	-.35
Geometric Designs	3.18	.82	3.28	.72	-.48
Draw-A-Man	16.43	4.75	15.28	5.45	.90
Body Identification	2.03	1.33	1.53	.87	1.77
Kraus-Weber	3.70	.64	3.03	1.06	3.05**
Angels-in-the-Snow	1.40	.79	1.12	.49	1.69
Padalino Clapping Patterns	14.32	3.18	15.40	2.24	-1.56
Auditory Vocal Sequencing	23.00	5.16	23.28	5.71	-.20
Auditory Vocal Association Test	17.21	2.51	17.34	3.21	-.17

TABLE 57

1969 Post Test Means, SD's, and t's in Individual Subtests
for Experimental and Control Groups III.
1968 Kindergarten Class (N = 20)

Subtests	Union - FP		Hawthorne Control		
	Mean	SD	Mean	SD	t
Simkov	8.55	2.66	8.05	2.62	.59
Geometric Designs	3.05	.75	2.45	.75	2.49*
Draw-A-Man	16.10	4.43	14.95	4.19	.84
Body Identification	2.15	1.26	1.30	.65	2.66*
Kraus-Weber	3.25	1.06	2.95	.75	1.02
Angels-in-the-Snow	1.20	.61	1.05	.22	1.02
Padalino Clapping Patterns	12.10	3.97	12.50	4.40	-.30
Auditory Vocal Sequencing	20.50	4.78	19.55	5.10	.60
Auditory Vocal Association Test	16.10	3.17	15.80	4.39	.24

Growth Scores 1968-1969

Indices of Improvement, or growth scores, were obtained by subtracting pre test scores from the post test scores obtained at the end of kindergarten for the 1968 kindergarten class. The means, standard deviations, and t-values for the individual subtests are presented in Tables 59 through 62 for Experimental and Control Groups I through IV, respectively.

As might be expected, the Experimental Group I, Union students in the full program of training, showed significantly higher gains in Table 59 on the Kraus-Weber Test ($t = 2.78$) and Body Identification ($t = 2.22$). Their mean on Draw-a-Man was close to significance ($t = 1.97$). The Hillside Control Group which had no training scored significantly higher (at the .05 level) on The Padalino Clapping Patterns ($t = -2.39$). According to the Hillside kindergarten teachers, clapping had been stressed during the year in their classes in preparation for the children's "graduation program."

Neither the Experimental (Union) nor the Control (Hillside) samples in Group II received training. The significantly higher growth score in Table 60 for the Control Group on The Padalino Clapping Patterns ($t = -3.11$) may also reflect the emphasis on clapping in the Hillside curriculum. No other significant differences in improvement were found although the means for Union on the Kraus-Weber and the Auditory Vocal Sequencing Test were close to significant differences.

Table 61 presents results for Union children in the complete program and the Hillside Hawthorne Control Group. The Union children manifested significant gains in Body Identification and near significant improvement in Geometric Designs.

No significant differences are shown in Table 62 which contains results on Union children whose scores met the cut off requirements for the program and Union children who just missed being included.

TABLE 58

* NOTE: This data was not available for Group IV at the time of publication.

TABLE 59

Means, SD's, and t's of 1969 Improvement on Individual Subtests for Experimental and Control Groups I 1968 Kindergarten Class (N = 22)

Subtests	Union - FP		Hillside - NT		
	Mean	SD	Mean	SD	t
Simkov	7.27	2.69	6.13	2.31	1.50
Geometric Designs	1.00	1.15	1.22	1.10	-.66
Draw-A-Man	7.09	4.48	4.40	4.53	1.97
Body Identification	.95	1.32	.27	.55	2.22*
Kraus-Weber	.86	1.16	-.09	1.10	2.78*
Angels-in-the-Snow	.04	.21	0.00	0.00	1.00
Padalino Clapping Patterns	6.59	4.15	9.22	3.05	-2.39*
Auditory Vocal Sequencing	3.13	3.04	3.40	4.21	-.24
Auditory Vocal Association Test	6.00	2.96	4.81	3.52	1.20

* Significant at the .05 level.

TABLE 60

Means, SD's, and t's of 1969 Improvement on Individual Subtests for Experimental and Control Groups II 1968 Kindergarten Class (N = 30)

Subtests	Union - NT		Hillside - NT		
	Mean	SD	Mean	SD	
Simkov	3.36	2.04	4.13	2.51	-1.29
Geometric Designs	.83	1.20	1.10	1.06	-.90
Draw-A-Man	4.06	5.88	2.43	5.02	1.15
Body Identification	.70	1.36	.26	.98	1.41
Kraus-Weber	.10	.84	-.40	1.16	1.90
Angels-in-the-Snow	.26	1.01	-.06	.63	1.52
Padalino Clapping Patterns	5.53	4.09	8.73	3.85	-3.11**
Auditory Vocal Sequencing Test	3.16	3.42	1.40	3.65	1.93
Auditory Vocal Association Test	3.56	3.13	3.36	2.73	.26

** Significant at the .01 level.

TABLE 61

Means, SD's, and t's of 1969 Improvement on Individual Subtests
for Experimental and Control Groups III
1968 Kindergarten Class (N = 18)

	Union - FP		Hawthorne Control		
Subtests	Mean	SD	Mean	SD	t
Simkov	5.66	2.86	5.72	2.32	-.06
Geometric Designs	1.77	.94	1.16	.92	1.96
Draw-A-Man	8.11	3.84	7.27	5.21	.54
Body Identification	1.16	1.29	.16	.61	2.95*
Kraus-Weber	.61	1.33	.22	1.00	.98
Angels-in-the-Snow	.22	.64	.05	.23	1.02
Padalino Clapping Patterns	8.38	5.31	7.27	4.41	.68
Auditory Vocal Sequencing	3.16	3.91	2.55	4.36	.44
Auditory Vocal Association Test	6.61	3.74	5.16	3.24	1.23

* Significant at the .05 level.

TABLE 62

Means, SD's, and t's of 1969 Improvement on Individual Subtests
for Experimental and Control Groups IV
1968 Kindergarten Class (N = 19)

	Union - FP		Union - NT		
Subtests	Mean	SD	Mean	SD	t
Simkov	5.84	3.32	5.57	3.02	.25
Geometric Designs	1.00	1.24	1.36	1.11	-.95
Draw-A-Man	6.68	4.48	4.94	3.55	1.32
Body Identification	.94	1.35	.73	1.04	.53
Kraus-Weber	.52	1.38	.47	1.30	.12
Angels-in-the-Snow	0.00	0.00	-.15	.50	1.37
Padalino Clapping Patterns	8.68	4.84	8.21	4.27	.31
Auditory Vocal Sequencing	3.84	3.51	2.68	3.12	1.07
Auditory Vocal Association Test	5.73	1.57	4.47	4.84	1.00

The post test results for the spring of 1970 yielded no significant differences in the general areas A, B, C, D, and T for the Experimental and Control Groups. See Tables 63 to 65.

TABLE 63

1970 Post Test Means, SD's, and t's in Areas A, B, C, D and Total Score for Experimental and Control Group I 1968 Kindergarten Class (N = 22)

	Union - FP		Hillside - NT		
Area	Mean	SD	Mean	SD	t
A	62.31	8.98	63.31	8.71	-.37
B	64.72	8.67	67.59	14.48	-.79
C	78.68	6.98	76.13	7.33	1.17
D	72.68	8.03	67.63	11.70	1.66
T	70.00	4.77	69.07	5.71	.58

TABLE 64

1970 Post Test Means, SD's, and t's in Areas A, B, C, D and Total Score for Experimental and Control Group II 1968 Kindergarten Class (N = 23)

	Union - NT		Hillside - NT		
Area	Mean	SD	Mean	SD	t
A	64.95	8.94	67.47	14.33	-.71
B	73.69	9.22	74.30	9.86	-.21
C	80.56	4.75	77.21	6.10	2.07
D	72.56	10.72	68.82	8.02	1.33
T	73.30	5.53	72.38	6.15	.53

TABLE 65

1970 Post Test Means, SD's, and t's in Areas A, B, C, D and Total Score for Experimental and Control Group IV 1968 Kindergarten Class (N = 16)

	Union - FP		Union - NT		
Area	Mean	SD	Mean	SD	t
A	62.50	10.17	63.18	8.04	-.21
B	69.62	9.35	66.93	8.58	.84
C	81.68	6.16	77.68	5.64	1.91
D	75.93	7.07	72.06	12.01	1.11
T	72.83	4.58	70.40	5.07	1.42

NOTE: 1970 Post test data for Group III were not available at the time of publication.

T-tests on the Nine Subtests of Variables A, B, C, D, and t

Means, standard deviations, and t's on the 1970 post tests are shown in Tables 66 through 68 for Experimental and Control Groups I, II, and IV, respecitvely on the individual subtests. Unfortunately, it was not possible to maintain Group III, the Hawthorne Control, during the 1969-70 school year. The group had dwindled considerably because so many of the Hillside children had transferred to parochial schools. There were no significant differences between the post test results for Experimental and Control Groups I, II, or IV. The Union Experimental Groups I and IV, both of which received the full program, obtained relatively higher means on Auditory Vocal Association.

TABLE 66

1970 Post Test Means, SD's, and t's in Individual Subtests
for Experimental and Control Groups I.
1968 Kindergarten Class (N = 22)

	Union - FP		Hillside - NT		
Subtests	Mean	SD	Mean	SD	t
Simkov	10.59	3.43	11.77	1.50	-1.47
Geometric Designs	2.77	.81	2.90	.68	-.60
Draw-A-Man	17.40	3.89	17.63	4.93	-.16
Body Identification	2.81	1.36	2.36	1.39	1.08
Kraus-Weber	3.13	1.03	3.18	1.09	-.14
Angels-in-the-Snow	1.68	.89	1.27	.70	1.68
Padalino Clapping Patterns	14.13	3.02	14.72	3.36	-.61
Auditory Vocal Sequencing	22.36	4.50	24.77	5.96	-1.51
Auditory Vocal Association Test	18.18	4.26	18.50	2.30	-.30

TABLE 67

1970 Post Test Means, SD's, and t's in Individual Subtests
for Experimental and Control Groups II.
1968 Kindergarten Class (N = 23)

	Union - NT		Hillside - NT		
Subtests	Mean	SD	Mean	SD	t
Simkov	12.52	1.78	12.04	2.36	.77
Geometric Designs	2.65	.71	2.86	.81	-.96
Draw-A-Man	17.86	4.50	19.78	6.63	-1.14
Body Identification	2.39	1.37	1.95	1.22	1.13
Kraus-Weber	3.65	.71	3.43	.78	.98
Angels-in-the-Snow	1.95	1.22	1.43	.84	1.68
Padalino Clapping Patterns	16.17	2.20	16.26	1.78	-.14
Auditory Vocal Sequencing	26.82	5.06	26.47	5.97	.21
Auditory Vocal Association Test	19.86	1.54	18.95	1.89	1.79

TABLE 68

1970 Post Test Means, SD's, and t's in Individual Subtests
for Experimental and Control Groups IV
1968 Kindergarten Class (N = 16)

	Union - CP		Hillside - NT		
	Mean	SD	Mean	SD	t
Simkov	11.31	2.52	12.31	1.70	-1.21
Geometric Designs	2.93	.57	2.06	.68	1.18
Draw-A-Man	17.93	4.06	17.18	4.73	.45
Body Identification	3.06	1.18	2.75	1.39	.65
Kraus-Weber	3.25	.85	3.18	1.16	.17
Angels-in-the-Snow	1.50	.92	1.62	1.02	.90
Padalino Clapping Patterns	15.37	3.12	15.06	2.46	.30
Auditory Vocal Sequencing	25.31	4.94	24.06	4.44	.73
Auditory Vocal Association Test	20.25	2.01	19.00	1.71	1.64

Kindergarten Class of 1968: Growth Scores 1969-70

Improvement indices, or growth scores, were again computed on individual subtests for Experimental and Control Groups I, II, and IV. These indices represent growth or improvement from the spring of kindergarten year to spring of the first grade, i.e., 1970 post-test score minus 1969 post test score.

The Hillside Control Group of Group I is shown to have significantly higher means than the Union children in Table 69 on the Simkov ($t = -2.67$) and on the Kraus-Weber ($t = -3.22$). This reflects the same pattern followed by the kindergarten class of 1967. As previously mentioned, this may indicate that the children who had received structured training in visual motor integration and in gross motor orientation during their kindergarten year manifested more growth in these areas during that year, whereas those children who did not participate in such activities developed more in these areas during first grade. The 1967 Experimental Group I, (Union children in the program), again showed significant growth in these areas during second grade, i.e., the third year of training. It would have been interesting to determine if the same pattern would have held true for the class of 1968. However, since the program was terminated in 1970, it was not possible to pursue this further.

It might be added at this point that during the academic year of 1969-70, Hillside employed a Learning Disabilities Specialist to work with first grades in groups of six for one half hour per day. Some of the children receiving such help were in the Control Groups.

TABLE 69

Means, SD's, and t's of 1970 Improvement on Individual Subtests for Experimental and Control Groups I. 1968 Kindergarten Class (N = 22)

	Union - FP		Hillside - NT		
Subtests	Mean	SD	Mean	SD	t
Simkov	.18	3.44	2.72	2.83	-2.67*
Geometric Designs	0.00	1.06	.18	.90	-.60
Draw-A-Man	2.22	4.90	4.27	4.95	-1.37
Body Identification	.68	1.39	.81	1.36	-.32
Kraus-Weber	-.50	1.10	.59	1.14	-3.22**
Angels-in-the-Snow	.63	.84	.27	.70	1.54
Padalino Clapping Patterns	2.40	4.20	1.22	2.50	1.13
Auditory Vocal Sequencing	3.59	3.20	4.09	4.10	-.45
Auditory Vocal Association Test	2.18	4.20	2.90	2.68	-.68

* Significant at the .05 level.

** Significant at the .01 level.

No significant differences in growth scores during the first grade are indicated in Tables 70 and 71 for Groups II or IV, respectively.

In Table 68 it may be seen that Union children receiving training compared with Union children not in the program showed relatively, but not significantly more growth in Geometric Designs, The Padalino Clapping Patterns, and Auditory Vocal Association.

TABLE 70

Means, SD's, and t's of 1970 Improvement on Individual Subtests for Experimental and Control Groups II. 1968 Kindergarten Class (N = 22)

Subtests	Union - NT		Hillside - NT		
	Mean	SD	Mean	SD	t
Simkov	2.68	2.93	1.72	2.14	1.23
Geometric Designs	-.45	1.05	-.27	.70	-.67
Draw-A-Man	1.54	5.71	4.27	5.81	-1.56
Body Identification	.63	1.36	.31	1.08	.85
Kraus-Weber	.04	.48	.45	1.14	-1.54
Angels-in-the-Snow	.59	1.29	.27	.70	1.01
Padalino Clapping Patterns	2.18	3.17	.86	2.37	1.56
Auditory Vocal Sequencing	4.77	2.72	3.68	4.97	.90
Auditory Vocal Association Test	2.50	2.15	1.77	2.44	1.04

TABLE 71

Means, SD's, and t's, of 1970 Improvement on Individual Subtests for Experimental and Control Groups III. 1968 Kindergarten Class (N = 15)

Subtests	Union - FP		Union - NT		
	Mean	SD	Mean	SD	t
Simkov	1.60	2.66	2.53	3.71	-.78
Geometric Designs	.13	.99	-.60	1.24	1.78
Draw-A-Man	1.73	5.29	1.60	4.70	.07
Body Identification	.80	1.32	.80	1.08	0.00
Kraus-Weber	-.53	.91	-.06	1.48	-1.03
Angels-in-the-Snow	.86	.91	.66	1.04	.55
Padalino Clapping Patterns	1.26	2.37	2.20	1.93	-1.18
Auditory Vocal Sequencing	4.53	1.88	3.26	1.98	1.79
Auditory Vocal Association Test	3.66	2.19	2.26	2.25	1.72

The previous analyses of improvement had been restricted to a consideration of growth over a single year. It was decided to investigate, as well, improvement over a two year period. Accordingly, two year indices of improvement were computed by subtracting 1968 pre test scores from 1970 post test scores. Means, standard deviations, and t-values are presented in Tables 69 through 71.

Kindergarten Class of 1968: Growth Scores 1968-70

There were no significant differences between the Experimental and Control Groups I in Table 72. The Hillside Control Group showed a relatively greater though not significant gain in Geometric Designs (t = -1.83).

The Union Experimental Group without training manifested near significant improvement in the Auditory Vocal Sequencing Test in Table 73. The fact that the Hillside Control Group tested significantly higher on The Padalino Clapping Patterns (t = 2.27) may reflect the previously mentioned emphasis on this type of training in preparation for the kindergarten "graduation" program.

TABLE 72

Means, SD's, and t's on Two-Year Indices of Improvement
On Individual Subtests for Experimental and Control Groups I
1968 Kindergarten Class (N = 20)

	Union - FP		Hillside - NT		
Subtests	Mean	SD	Mean	SD	t
Simkov	7.25	4.90	9.00	1.97	-1.47
Geometric Designs	.85	1.34	1.55	1.05	-1.83
Draw-A-Man	8.70	5.60	9.00	3.97	-.19
Body Identification	1.65	1.59	1.15	1.46	1.08
Kraus-Weber	.35	1.30	.40	1.46	-.11
Angels-in-the-Snow	.65	.87	.30	.73	1.37
Padalino Clapping Patterns	8.50	5.54	10.70	3.31	-1.52
Auditory Vocal Sequencing	6.50	3.96	7.40	3.78	-.73
Auditory Vocal Association Test	7.65	6.11	7.90	3.65	-.15

TABLE 73

Means, SD's, and t's on Two-Year Indices of Improvement on Individual Subtests for Experimental and Control Groups II
1968 Kindergarten Class (N = 22)

Subtests	Union - NT		Hillside - NT		
	Mean	SD	Mean	SD	t
Simkov	6.09	2.81	6.63	2.95	-.62
Geometric Designs	.54	1.43	.63	1.09	-.23
Draw-A-Man	6.00	4.81	7.72	5.58	-1.09
Body Identification	1.09	1.50	.68	1.24	.97
Kraus-Weber	.13	.94	.09	1.23	.13
Angels-in-the-Snow	.86	1.20	.31	1.04	1.60
Padalino Clapping Patterns	6.54	4.28	9.27	3.64	-2.27*
Auditory Vocal Sequencing	7.40	3.33	4.22	6.36	2.07
Auditory Vocal Association Test	6.31	3.59	5.59	3.45	.68

* Significant at the .05 level.

As shown in Table 74, No significant differences were observed between the Union groups with training and without. The Union Experimental Group did demonstrate relatively greater but not significant improvement on Draw-a-Man (t = 1.72).

TABLE 74

Means, SD's, and t's for Two-Year Indices of Improvement on Individual Subtests for Experimental and Control Groups IV
1968 Kindergarten Class (N = 16)

Subtests	Union - FP		Union - NT		
	Mean	SD	Mean	SD	t
Simkov	7.87	3.18	8.93	3.25	-.93
Geometric Designs	1.06	1.12	1.00	1.09	.15
Draw-A-Man	9.43	4.47	7.00	3.48	1.72
Body Identification	2.06	1.18	1.31	1.44	1.60
Kraus-Weber	.31	1.07	.37	1.40	-.14
Angels-in-the-Snow	.93	.92	.50	1.21	1.14
Padalino Clapping Patterns	9.37	4.77	10.81	3.70	-.95
Auditory Vocal Sequencing	8.37	3.96	6.25	4.12	1.48
Auditory Vocal Association Test	9.56	3.82	7.50	4.41	1.41

The Metropolitan Readiness Test

The Metropolitan Readiness Test was administered by a psychometrist in Union who trained two perception teachers to administer them to the children in Hillside. Means, standard deviations, and t-values are presented in Tables 75 through 77 for Experimental and Control Groups I, II, and IV. No significant differences were observed.

TABLE 75

Means, SD's, and t's on the Metropolitan Readiness Test for Experimental and Control Groups I 1968 Kindergarten Class (N = 22)

	Union - FP		Hillside - NT		
Subtests	Mean	SD	Mean	SD	t
Matching	13.86	5.22	12.33	4.01	1.02
Copying	6.40	2.66	5.55	2.38	1.05
Tests 1-4	48.86	15.61	49.44	6.08	-.14
Tests 1-6	73.72	9.59	69.77	9.20	1.31

TABLE 76

Means, SD's, and t's on the Metropolitan Readiness Test for Experimental and Control Groups II 1968 Kindergarten Class (N = 20)

	Union - NT		Hillside - NT		
Subtests	Mean	SD	Mean	SD	t
Matching	15.85	2.18	15.68	2.49	.20
Copying	7.90	1.61	6.82	3.98	1.10
Tests 1-4	55.20	5.77	51.52	11.96	1.21
Tests 1-6	79.55	8.75	73.76	12.34	1.66

TABLE 77

Means, SD's, and t's on the Metropolitan Readiness Test for Experimental and Control Groups IV 1968 Kindergarten Class (N = 15)

	Union - FP		Union - NT		
Subtests	Mean	SD	Mean	SD	t
Matching	15.06	3.05	14.14	2.24	.92
Copying	6.93	1.48	6.85	2.17	.11
Tests 1-4	54.93	3.76	51.85	5.20	1.83
Tests 1-6	77.13	7.01	74.21	7.86	1.05

Tables 78 and 79 summarize the data presented in previous tables. The Means, Standard deviations, and n's for the experimental and control groups of the 1968 kindergarten class on the 1968 pre tests and the 1969 and 1970 post tests are included in Table 75. Table 76 contains the t-values for the three sets of improvement indices, 1969, 1970 and the two year measure of growth.

The Union Experimental Group I, which received the full training program, improved in six of the nine areas and significantly so in two, Body Identification and Kraus Weber. As previously discussed, the Hillside group improved significantly in the Padalino Clapping Patterns. This significant improvement is apparent in both Hillside Control Groups I and II and undoubtedly is related to the special training they received in kindergarten. By the second year, this control group improved more. This differential in the time of improvement suggests an initial spurt attributable to the program of training but the children without training improved during the next year at the same rate as those in the program.

No significant differences in improvement (other than clapping) appear for the groups without training, Experimental and Control Groups II. Nor are there any significant improvement indices for the Experimental and Control Groups IV. In the first year, however, eight of the nine indices favor the group with training.

Experimental and Control Groups III consisted of Union children in the program and the Hawthorne Control. Unfortunately, this was maintained only through the kindergarten year. Eight of the nine indices show the children receiving training improved more than those in the Hawthorne group. The only significant difference was in Body Identification, the subtest in which previous groups receiving training (1967 Experimental Group I and 1968 Experimental Group I) also indicated significant gains.

TABLE 78

Summary of Means and N's for Individual Subtests of Experimental and Control Groups I, II, III, and IV in 1968 Pre Test and Post Tests in 1969 and 1970
1968 Kindergarten Class

I - Experimental Group-Union-Full Program (U-FP) and Control Group-Hillside-No Training (H-NT)

	1968 (N = 24)		1969 (N = 24)		1970 (N = 22)	
Subtests	U-FP	H-NT	U-FP	H-NT	U-FP	H-NT
Simkov	3.16	2.87	10.41	9.08*	10.59	11.77
Geometric Designs	1.70	1.41	2.75	2.70	2.77	2.90
Draw-A-Man	8.50	8.83	15.20	13.29	17.40	17.63
Body Identification	1.12	1.17	2.16	1.50*	2.81	2.36
Kraus-Weber	2.83	2.86	3.62	2.66**	3.13	3.18
Angels-in-the-Snow	1.00	1.00	1.04	1.00	1.68	1.27
Padalino Clapping Patterns	5.29	3.45	11.70	13.12	14.13	14.72
Auditory Vocal Sequencing	15.62	17.04	18.83	20.58	22.36	24.77
Auditory Vocal Association Test	9.95	10.33	15.95	15.50	18.18	18.50

II - Experimental Group-Union-No Training (U-NT) and Control Group-Hillside-No Training (H-NT)

	1968 (N = 32)		1969 (N = 32)		1970 (N =)	
Subtests	U-NT	H-NT	U-NT	H-NT	U-NT	H-NT
Simkov	6.59	6.06	10.18	10.37	12.52	12.04
Geometric Designs	2.37	2.25	3.18	3.28	2.65	2.86
Draw-A-Man	12.32	12.50	16.43	15.28	17.86	19.78
Body Identification	1.37	1.28	2.03	1.53	2.39	1.95
Kraus-Weber	3.62	3.46	3.70	3.03*	3.65	3.43
Angels-in-the-Snow	1.15	1.18	1.40	1.12	1.95	1.43
Padalino Clapping Patterns	8.71	6.90	14.32	15.40	16.17	16.00
Auditory Vocal Sequencing	19.81	22.06*	23.00	23.28	26.82	26.47
Auditory Vocal Asscciation Test	13.71	13.90	17.21	17.34	19.86	18.95

III - Experimental Group-Union-Full Program (U-FP) and Control Group-Hillside-Hawthorne Control (H-HC)

Subtests	1968 (N=20)		1969 (N=20)	
	U-FP	H-HC	U-FP	H-HC
Simkov	3.10	2.65	8.55	8.05
Geometric Designs	1.35	1.30	3.05	2.45*
Draw-A-Man	7.95	7.90	16.10	14.95
Body Identification	1.00	1.05	2.15	1.30**
Kraus-Weber	2.78	2.52	3.25	2.95
Angels-in-the-Snow	1.00	1.00	1.20	1.05
Padalino Clapping Patterns	4.10	4.75	12.10	12.50
Auditory Vocal Sequencing	17.40	17.20	20.50	19.55
Auditory Vocal Association Test	9.75	10.45	16.10	15.80

IV - Experimental Group-Union-Full Program (U-FP) and Control Group-Union-No Training (U-NT)

	1968		1969		1970 (N=16)	
	U-FP	H-HC	H-FP	H-HC	U-FP	H-HC
Simkov					11.31	12.31
Geometric Designs					2.93	2.62
Draw-A-Man					17.93	17.18
Body Identification	Data not available at the time of publication.				3.06	2.75
Kraus Weber					3.25	3.18
Angels-in-the-Snow					1.93	1.62
Padalino Clapping Patterns					15.37	15.06
Auditory Vocal Sequencing					25.31	24.06
Auditory Vocal Association Test					20.25	19.00

* Significant at the .05 level.

** Significant at the .01 level.

TABLE 79

Summary of t's[1] for 1969, 1970, and Two-Year Improvement Indices on Individual Subtests of Experimental and Control Groups I, II, III,[2] and IV 1968 Kindergarten Class

Subtests	t's Groups I			t's Groups II			t's Groups III		t's Groups IV	
	1969	1970	2-YR	1969	1970	2-YR	1969	1969	1970	2-YR
Simkov	1.50	-2.67*	-1.47	-1.29	1.23	-.62	-.06	.25	-.78	-.93
Geometric Designs	-.66	-.60	-1.83	-.90	-.67	-.23	1.96	-.95	1.78	.15
Draw-A-Man	1.97	-1.37	-.19	1.15	-1.56	-1.09	.54	1.32	.07	1.72
Body Identification	2.22*	-.32	1.08	1.41	.85	.97	2.95*	.53	.00	1.60
Kraus-Weber	2.78*	-3.22**	-.11	1.90	-1.54	.13	.98	.12	-1.03	-.14
Angels-in-the-Snow	1.00	1.54	1.37	1.52	1.01	1.60	1.02	1.37	.55	1.14
Padalino Clapping Patterns	-2.39*	1.13	-1.52	-3.11**	1.56	-2.27*	.68	.31	-1.18	-.95
Auditory Vocal Sequencing	-.24	-.45	-.73	1.93	.90	2.07	.44	1.07	1.79	1.48
Auditory Vocal Association Test	1.20	-.68	-.15	.26	1.04	.68	1.23	1.00	1.72	1.41
N	22	22	20	30	22	22	18	19	15	16

* Significant at the .05 level.

** Significant at the .01 level.

NOTE 1. A positive t-value indicates greater improvement for the experimental groups.

NOTE 2. The Hawthorne Control Group was maintained only through the kindergarten year.

Discussion

For the kindergarten class of 1967, the data on pre and post tests as well as on the gain between pre and post tests of the nine variables indicate that the perceptual training program was most effective in the areas of visual-motor integration, in some aspects of gross motor development, and, in some instances, in associative processes and in sequencing. There were also indications of gains in these areas when these children were second graders.

The results of the data on the kindergarten class of 1968 suggest that they followed the same pattern as the class of 1967, i.e., significant differences were noted in the same areas during the kindergarten year with a leveling off during first grade. Since the program was terminated at that time, it cannot be determined if they, too, would have shown another growth spurt in these areas during second grade, as did the previous class. It is interesting to note that the two kindergarten classes manifested similar growth patterns despite the fact that some of the children in the experimental and control groups in the class of 1968 had pre tested considerably higher than the children in the experimental and control groups in the class of 1967.

ADDITIONAL DATA

Correlation of Tests for the First Year of the Project

After the first year of the program, coefficients of correlation were computed on selected pre and post tests for the kindergarten class of 1967. Table 80 lists the tests which included some of the subtests and parts of the Metropolitan Readiness Tests. The coefficients were obtained for the total populations of Union and Summit (Table 81), for all Union children not in the program (Table 82), for all Union children in the training program (Table 83), for Union children in the training program excluding those without gross motor training (Table 84), for all Summit children (Table 85), for Experimental Group I (Table 86), for Control Group I (Table 87), for Experimental Group II (Table 88), for Control Group II (Table 89), and for Experimental Group III (Table 90).

TABLE 80

List of Subtests and Symbols Used in Matrices of Coefficients of Correlation

Pre Tests

1 - Simkov

2 - Draw-a-Man

3 - Body Identification

4 - Auditory Vocal Association

Post Tests

5 - Copy (Test of Metropolitan Readiness Test)

6 - Simkov

7 - Draw-a-Man

8 - Body Identification

9 - Auditory Vocal Association

TABLE 81

Coefficients of Correlation Between Selected Subtests
of 1967 Pre Tests and 1968 Post Tests for
1967 Kindergarten Class
Union and Summit Populations (N = 542)

Pre Tests	Pre Tests			Post Tests				
	2	3	4	5	6	7	8	9
1 - Simkov	.44	.21	.40	.52	.55	.42	.13	.28
2 - Draw-A-Man		.18	.25	.30	.34	.39	.11	.22
3 - Body Identification			.26	.13	.11	.12	.35	.23
4 - Auditory Vocal Association				.35	.36	.28	.20	.61
Post Tests								
5 - Copy					.64	.31	.09	.32
6 - Simkov						.29	.07	.29
7 - Draw-A-Man							.09	.20
8 - Body Identification								.23

Note : All correlations .09 and larger are significantly different from zero at the .05 level. All correlations .12 and larger are significantly different from zero at the .01 level.

_____ indicates test retest reliabilities.

TABLE 12

Coefficients of Correlation Between Selected Subtests
of 1967 Pre Tests and 1968 Post Tests of
1967 Kindergarten Negro
Negro Children Not in the Treatment Program (N = 171)

	Pre-Test				Post Tests			
Pre Tests	2	3	4	5	6	7	8	9
1 – Simkov	.34	.24	.21	.21	.50	.49	.18	.19
2 – Draw-A-Man		.17	.14	.19	.22	.30	.14	.11
3 – Body Identification			.25	.17	.12	.11	.16	.21
4 – Auditory Vocal Association				.27	.25	.25	.26	.57
Post Tests								
5 – Copy					.57	.26	.15	.26
6 – Simkov						.22	.10	.16
7 – Draw-A-Man							.11	.11
8 – Body Identification								.29

Note 1: All correlations .10 and larger are significantly different from zero at the .05 level. All correlations .13 and larger are significantly different from zero at the .01 level.

_____ indicates test retest reliabilities.

TABLE 83

Coefficients of Correlation Between Selected Subtests
of 1967 Pre Tests and 1968 Post Tests of
1967 Kindergarten Class
All Union Children in Program Including Those Without
Gross Motor Training (N = 105)

	Pre Tests			Post Tests				
Pre Tests	2	3	4	5	6	7	8	9
1 - Simkov	.58**	-.02	.27**	.43**	.36**	.33**	.05	.28**
2 - Draw-A-Man		.13	.20*	.38**	.36**	.47**	.09	.24*
3 - Body Identification			.20*	-.09	.04	.05	.35**	.17
4 - Auditory Vocal Association				.27	.28	.17	.02	.55**
Post Tests								
5 - Copy					.63**	.27**	-.03	.35**
6 - Simkov						.25**	.06	.47**
7 - Draw-A-Man							.12	.24*
8 - Body Identification								.09

* Significant at the .01 level.

** Significant at the .05 level.

____ Indicates test-retest reliability.

TABLE 84

Coefficients of Correlation Between Selected Subtests of 1967 Pre Tests and 1968 Post Tests for 1967 Kindergarten Class Union Children in Complete Program Excluding Those Without Gross Motor Training (N = 76)

	Pre Tests			Post Tests				
Pre Tests	2	3	4	5	6	7	8	9
- Simkov	.65**	.05	.24*	.41**	.38**	.34**	.10	.30*
- Draw-A-Man		.22	.27*	.44*	.43*	.53*	.05	.26*
- Body Identification			.21	-.11	.09	.08	.38**	.26*
- Auditory Vocal Association				.19	.19	.05	.05	.52**
Post Tests								
- Copy					.64**	.35**	.09	.29*
- Simkov						.25*	.06	.36**
- Draw-A-Man							.15	.18
- Body Identification								.07

* Significant at the .05 level.

** Significant at the .01 level.

— Indicates Test Retest Reliability.

TABLE 85

Coefficients of Correlation Between Selected Subtests of 1967 Pre Tests and 1968 Post Tests for 1967 Kindergarten Class Summit Students Without Training (N = 53)

	Pre Tests			Post Tests				
Pre Tests	2	3	4	5	6	7	8	9
1 - Simkov	.53**	.02	.26	.57**	.70**	.39**	.16	.18
2 - Draw-A-Man		.05	.30*	.50**	.57**	.67**	.10	.25
3 - Body Identification			.26	.04	.14	.06	.40**	.24
4 - Auditory Vocal Association				.28*	.20	.28*	.45**	.66**
Post Tests								
5 - Copy					.65**	.48**	.08	.13
6 - Simkov						.47**	.12	.15
7 - Draw-A-Man							.04	.21
8 - Body Identification								.39**

* Significant at the .05 level.

** Significant at the .01 level.

___ Indicates Test-Retest Reliability.

TABLE 86

Coefficients of Correlation Between Selected Subtests of 1967 Pre Tests and 1968 Post Tests for 1967 Kindergarten Class Experimental Group I - Union Students in Complete Program of Training (N = 16)

	Pre Tests			Post Tests				
Pre Tests	2	3	4	5	6	7	8	9
2 - Simkov	.26	-.31	.34	.51*	.23	.43*	-.11	.24
3 - Draw-A-Man		-.34	-.14	.34	.14	.09	-.04	.05
4 - Body Identification			.19	-.06	.02	-.13	.40	.06
5 - Auditory Vocal Association				.32	.51*	.39	-.03	.54*
Post Tests								
6 - Copy					.67**	.08	-.27	.53*
7 - Simkov						.31	.13	.89**
8 - Draw-A-Man							.17	.28
9 - Body Identification								.20

* Significant at the .05 level.

** Significant at the .01 level.

____ Indicates test-retest reliability.

TABLE 87

Coefficients of Correlation Between Selected Subtests of 1967 Pre Tests and 1968 Post Tests for 1967 Kindergarten Class Control Group I - Summit Students Without Training (N = 16)

	Pre Tests			Post Tests				
Pre Tests	2	3	4	5	6	7	8	9
1 - Simkov	.33	-.23	-.19	.67**	.76**	.33	-.18	-.51
2 - Draw-A-Man		-.17	.18	.36	.45	.29	-.23	.07
3 - Body Identification			.13	-.14	-.38	-.45	.60*	.24
4 - Auditory Vocal Association				-.04	.15	.08	.55*	.66**
Post Tests								
5 - Copy					.75**	.44	-.31	-.18
6 - Simkov						.43	-.16	-.16
7 - Draw-A-Man							-.10	.27
8 - Body Identification								.54*

* Significant at the .05 level.

** Significant at the .01 level.

____ Indicates test-retest reliability.

TABLE 88

Coefficients of Correlation Between Selected Subtests of 1967 Pre Tests and 1968 Post Tests for 1967 Kindergarten Class Experimental Group II - Union Students Without Training (N = 22)

	Pre Tests			Post Tests				
Pre Tests	2	3	4	5	6	7	8	9
1 - Simkov	.47*	.23	.42*	.22	.67**	.29	-.11	.33
2 - Draw-A-Man		.45*	.53*	.02	.36	.47*	.42*	.55**
3 - Body Identification			.26	.14	.13	.45*	.32	.45*
4 - Auditory Vocal Association				.10	.45*	.14	.10	.43*
Post Tests								
5 - Copy					.35	.26	.03	.14
6 - Simkov						.45*	.12	.30
7 - Draw-A-Man							.16	.43*
8 - Body Identification								.06

* Significant at the .05 level.

** Significant at the .01 level.

____ Indicates test-retest reliability.

TABLE 89

Coefficients of Correlation Between Selected Subtests of 1967 Pre Tests and 1968 Post Tests for 1967 Kindergarten Class
Control Group II - Summit Students Without Training (n = 22)

	Pre Tests			Post Tests				
Pre Tests	2	3	4	5	6	7	8	9
1 - Simkov	-.05	.05	.25	.31	.48*	-.09	.16	.06
2 - Draw-A-Man		-.16	.31	.32	.12	.69**	.04	.03
3 - Body Identificatior.			.21	-.10	-.09	-.18	.46*	.08
4 - Auditory Vocal Association				.37	-.05	.31	.52*	.41*
Post Tests								
5 - Copy					.35	.13	.40	.06
6 - Simkov						.14	.14	.07
7 - Draw-A-Man							-.13	-.18
8 - Body Identification								.44*

* Significant at the .05 level.

** Significant at the .01 level.

____ Indicates test-retest reliability.

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TABLE 90

Coefficients of Correlation Between Selected Subtests of 1967 Pre-Tests and 1968 Post Tests for 1967 Kindergarten Class Experimental Group III - Union Students in the Complete Program (N = 13)

	Pre Tests			Post Tests				
Pre Tests	2	3	4	5	6	7	8	9
1 - Simkov	.42	-.43	.45	.47	.50	.22	.05	.34
2 - Draw-A-Man		-.18	-.10	-.16	-.10	.32	.40	.30
3 - Body Identification			-.16	-.11	-.57*	-.24	.27	-.61*
4 - Auditory Vocal Association				.60	.63*	.57*	.21	.61*
Post Tests								
5 - Copy					.65*	-.02	-.26	.39
6 - Simkov						.11	.08	.67*
7 - Draw-A-Man							.46	.48
8 - Body Identification								.02
9 - Auditory Vocal Association								

* Significant at the .05 level.

** Significant at the .01 level.

____ Indicates test-retest reliability

Pre Test - Post Test Correlations

The pre test-post test correlations for the selected subtests are essentially test-retest reliability coefficients. In the Tables 81 through 90 these appear as the correlations between Variables 1 and 6 for the Simkov, 2 and 7 for Draw a Man, 3 and 8 for Body Identification, and 4 and 9 for Auditory Vocal Association. The reliabilities were generally low although the range of values were large and the sizes of the groups ranged from 542 to 13. The Simkov and Auditory Vocal Association Tests were more reliable for the large groups than Draw a Man and Body Identification. The lack of reliability undoubtedly affected the analyses of the differences between the means on subtests and improvement indices discussed earlier.

The low correlations between test-retest scores are partially the results of the restricted range of scores on subtests (for example Body Identification), the homogeneity of the subjects (all kindergarten children), and the effects of the training involved in the complete program or the enrichment program.

Moreover, the children may have gained differentially due to inherent maturational tendencies, environmental factors, the kindergarten program, or the perceptual training program.

Intertest Correlations on Pretests

The correlations between the pretest of Simkov and the pretest of Draw-a-Man were relatively high for each group studied. This may reflect a commonality of integrative processes and of perceptual analysis and synthesis. This may be analogous to Alan Ross' (DeHirsch 1966, p.38) suggestion that the Bender Gestalt and Draw-a-Man require integrative competence, which he defines as "that function of an organism which combines and relates discrete cues and makes a unified response possible."

In the larger samplings (Table 81 - N = 542; Table 82 - N = 371) there were low but significant correlations between the pretest of Body Identification and the pretests of the other three tests, viz. Simkov, Draw-a-Man, and the Auditory Vocal Association Test. This did not hold true for the Experimental and Control Groups, i.e. Body Identification did not correlate significantly with the other tests except for the 22 Union children without training (Table 88) in which case there was a correlation at the .05 level of significance with Draw-a-Man.

The lack of correlation of Body Identification with the other tests where the samplings were small may reflect the range of the test. Another explanation is that the ability to identify parts of the body may have reached a plateau for most children of this age range. This may be in keeping with de Hirsch's suggestion regarding gross motor development as previously discussed. (See above.)

The pretest of the Auditory Vocal Association Test correlated very significantly with the pretest of Simkov and with Copy when the sampling was large. (See Table 81, N = 542 and Table 82, N = 371). The correlations were effectively zero for the smaller samplings. The significant correlations agree with Kopitz's (1966, p. 48) findings in a study involving children in grades 1 through 4. In her study the Verbal I.Q. on the W.I.S.C. "revealed a close relationship to the Bender performance of the younger group of subjects. This seems to support Bender's statement that the Bender test is related to language ability in young children." She goes on to state that this is not so of the older children (9 to 10 years old) because the advanced levels of the intelligence tests demand not only factual information but logical and social understanding, neither of which, she feels, is related to copying Gestalt figures. Kopitz's findings may substantiate those of Witkin et al. (1962, p. 202). In their study with 10 year old boys they found that certain "verbal skills" as measured by the W.I.S.C. show little relation to mode of field approach. They all refer to the research of Werner and Piaget, which states that, in the young child, language is closely associated with action and perception but gradually becomes separated from the concrete so that he eventually employ words which do not refer to his world of perception. Thus, Witkin and his colleagues suggest that the W.I.S.C. verbal subtests (Vocabulary, Comprehension, Information) used in their study do not evaluate the extent of articulation in the language medium. This, they feel, is a possible explanation for the limited relation found in their study with ten year old boys between verbal ability and differentiation as applied to mode of field approach.

The fact that Kopitz and Witkin found in their respective studies limited relation between perceptual abilities and verbal abilities among ten year olds, whereas this study yielded a very significant correlation between perceptual abilities and verbal abilities as measured by the Auditory Vocal Association Test may be due to:

1. The difference in chronological age, as discussed above.

2. The nature of the verbal tests used in the studies. The Auditory Vocal Association Test is a test of opposite relationships. Perhaps this taps an ability which is more heavily weighted in associative and analytical processes than the Verbal I.Q. of the W.I.S.C. or the combination of W.I.S.C. subtests used by Witkin. Luria (1967, p. 468) included tests of opposite relationships to investigate concept formation. It is interesting to note, however, that Kopitz found no relation in any of her groups between Bender performance and Information, Comprehension or Similarities. As previously stated, she suggests that there is no relationship between copying Gestalt figures and logical reasoning.

3. The size of the sampling. The low but significant correlations between the Simkov and Auditory Vocal Association Tests in this

study were found with groups of 542 and 371. When the N was 76, the correlation, r = .24 was significant at the .05 level. The correlation, r = .42 was significant at the .05 level for Experimental Group II, N = 22. (See Table 88). There was no significant correlation for the control children in Summit (N = 53). Kopitz's groups ranged from 25 to 30. Witkin's groups consisted of 30. He suggested (1962, p. 201), in fact, that his study be repeated with other groups because of the limited size of his sampling, particularly since he found considerable discrepancy between verbal and performance scores.

Intertest Correlations of Pretests Compared With Intertest Correlations With Post tests.

The general patterns of intertest correlations of pretests compared with intertest correlations of post tests are as follows:

A. Children in Union, Program and Non-Program:

In general the correlations between pre tests of Draw-a-Man and Simkov were higher than the correlations on post tests. This may reflect the growth of the entire Union population in the area of visual motor integration. This lower correlation in the post test between Simkov and Draw-a-Man may be explained by Kopitz's study, in which she concluded that drawing a man is developmental ability and thus improves with C.A. or maturation rather than with training in kindergarten. She also stated that perceptual motor integration "improves considerably during the kindergarten year." Therefore, reproduction of Gestalt figures may have improved significantly with the curriculum whereas the ability to draw a man may have improved less dramatically.

B. Union Children Receiving Perceptual Training:

The correlations between the post tests of the Simkov and the Auditory Vocal Association Test were consistently significant, regardless of the size of the group. This was not true of the Union non-program children nor of the population in the control school system. Perhaps this indicates that the diagnostic teaching approach tends to equalize the uneven developmental patterns of children this age. This may be particularly so of children who manifested relative developmental lags. Kopitz (1966, p. 65) suggests that children do not mature at the same rate in the various higher mental functions. She finds that early verbal maturation was usually accompanied by slower maturation in the visual-motor integration.

C. Children in the Control School System

The correlations computed for the children in the control school system (Table 85) indicate that there were no significant changes in pre and post correlations excepting that, whereas Body Identification did not correlate with Auditory Vocal Association on the pretest, the post test correlations were significant. This population showed the most growth on this latter test. This high post test correlation may reflect emphasis in the curriculum on one or both these areas.

Discussion

Intertest correlations seem to reflect patterns which are relevant to factors influencing the groups used in the comparisons. Some of these factors may be:

1. Differences in curriculum emphasis between the two school systems.
2. The effect of perceptual training on the children in the Union School system.
3. The size of the samplings.

That this last factor, viz. size of sampling, is a significant one becomes apparent when one notes the range of correlation between two tests from very significant to zero, depending upon the size of the group. This seems to have implications with respect to the interpretation of data in studies, particularly when the sampling is small.

The Wechsler Intelligence Scale for Children and the Binet Vocabulary

The Wechsler Intelligence Scale for Children and the Binet Vocabulary test were administered as pre and post tests to the Experimental and Control Groups I of the 1968 kindergarten class, Union children receiving training and the Hillside Control Group receiving no training.

Unfortunately, the pre testing was not done until December of the kindergarten year, so that the Union children had had three months of training. To further complicate the interpretation of data, it was learned after the Hillside group was retested, that the W.I.S.C. had also been administered to them six weeks previously as part of a screening program for the remediation of learning disabilities.

The data were analyzed by means of t-tests and the Wilcoxon test for correlated samples. No differences between the groups were formed on the Verbal, Performance or Full Scale I.Q.'s on pre tests or post tests. Due to the intervening events in this sub-study, no conclusions or interpretations were attempted.

Two points of interest were noted. First, the Union group had generally higher performance I.Q.'s on both pre and post tests. The differences between the means were close to significance at the .05 level. Secondly, there were more discrepancies between the verbal and performance quotients for the Union students than for the Hillside students.

Correlation of Data Obtained From Questionnaires

Correlations were computed on data obtained from questionnaires filled out by parents or guardians during the initial pre-school testing of the summers of 1967 and 1968.

Because of the large N (N = 729 in 1967 and N = 689 in 1968), almost all the correlations were significant at the .05 level. However, the following seem worthwhile mentioning in that significant correlations were obtained with both kindergarten classes:

	r	
	1967	1968
1. The attitude of the mother toward her child with the age at which the child talked.	.43	.47
2. The age at which the child crawled with the age at which he started to walk	.82	.72
3. The age at which the child started to talk with		
a. the educational level of the mother		
b. the educational level of the head of the family	.35	.76
c. experiential activities the child engaged in	.30	.69
d. experiential opportunities provided for the child	.29	.81
4. The educational level of the head of the family with		
a. the educational level of the mother	.69	.55
b. the experiential opportunities provided for the child	.32	.68
5. The emotional-social stability of the child with the educational level of the mother	.32	.47
6. Incidence of fevers with post-natal disorders	.36	.43

	r	
	1967	1968
Educational level of the mother with		
a. experiential activities engaged in by the child	.38	.75
b. experiential opportunities provided by the parent (s)	.40	.68
8. Experiential activities engaged in by the child with the experiential opportunities provided by the parent (s)	.38	.74

The above findings suggest the importance of parent education with regard to parent-child interaction during the formative pre-school years. Whereas some variables correlated highly with each other in one class, they correlated at a relatively lower significant level, if at all, in the other class. The following correlations were noted.

Variables		r 1967	r 1968
1. Attitude of mother toward the child with walking and with crawling	(w)	.64	.03
	(c)	.76	.02
2. Crawling with education level of the mother		.70	.004
3. Age the child started walking with educational level of the mother		.64	.04
4. Position of the child in the family with disorders during the mother's pregnancy		.06	?
5. Age child started crawling with right handedness, i.e.		.35	.67
6. Age the child started walking with right handedness		.35	.76
7. The age at which the child started to talk with			
a. The raw score on the Auditory Vocal Association Test		.06	.89

Variables	r	
	1967	1968
8. The Auditory Vocal Association Test with		
a. the Emotional-Social Stability of the child	.01	.64
b. the Occupation of the Head of the Family	.10	.86
c. the Educational Level of the Head of the Family	.06	.72
d. the Educational Level of the Mother	.02	.65
e. the Experiential Activities Engaged in by the Child	.06	.65
f. the Experiential Opportunities provided by the parents	.04	.74
g. the Birth History of the Child	.009	.84
h. the Post Natal History of the Child	.001	.84
The Higher the test score the least incidence of complications		
9. The Occupation of the Head of the Family with		
a. disorders during his wife's pregnancy	.07	.66
b. complications during the birth of the child	.12	.89
c. incidence of post natal disorders	.10	.91
The Lower the socio-economic level the higher incidence of such complications.		
10. The Educational Level of the Head of the Family with		
a. complications during the birth of the child and	.22	.75
b. the incidence of post natal disorders	.23	.74
11. Experiential Opportunities with complications during		
a. the birth of the child and	.18	.76
b. the incidence of post natal disorders		

Variables	1967	1968
12. Disorders during pregnancy with		
a. complications during the birth of the child and	.25	.66
b. with the incidence of post natal disorders	.21	.66
13. Complications during the birth of the child with the incidence of post natal disorders	.25	.96

It is interesting to note that for the most part the above variables correlated in the expected direction. These findings, too, seem to support implications for parent education, relevant to pre-natal care, health education, and parent-child interaction.

More variables correlated significantly with the birth and developmental data taken during the summer of 1968 than with that taken during the summer of 1967. This may be accounted for by:

1. More hesitancy on the part of the parents during the initial year of the project to divulge information which they felt would "label" their children or earmark them for a special class or a special program.

2. The method by which the data was obtained. During the first summer such information was obtained by a fifteen minute interview with a psychologist, whereas this part of the "history" was included in the written questionnaire during the summer of 1968. Perhaps the parents felt less threatened by filling out a form than by relating to a psychologist who had not had enough time to gain their confidence.

CONCLUSIONS

A three year program of early identification and remediation of perceptual deficiencies in order to prevent or minimize learning disabilities was conducted with two successive classes of kindergarten children. The "program children" entering school in 1967 received intensive training for three years, whereas the "program children" entering school in 1968 were given intensive perceptual training for two years.

In both classes, the comparison of pre and post tests indicates that the training was most effective in the areas of visual-motor integration and in certain aspects of gross motor development, particularly in awareness of body parts. There were also sporadic indications of significant improvement in associative processes and in sequencing. Intertest correlations run on the pre and post tests of the first year of the project suggest that training during that year was effective in equalizing the uneven developmental patterns of kindergarten children so as to fill in developmental gaps.

It was unfortunate that the Hawthorne Experimental and Control Groups could not be maintained beyond the kindergarten year. The test-retest results after the one year during which it was in operation suggest that the training per se is more important than "attention" in bringing about significant improvement in the areas tested. However, the importance of the attention factor should not be overlooked.

The test results also suggest that there is carry over from this type of training to the academic subjects. In the class of 1967, a sampling of Union children excluding those who pretested in the lowest 5-10% receiving an enrichment program tested significantly higher on the Metropolitan Readiness Test (Copy and Tests 1-6). In the class of 1968, a sampling of Union children tested higher (but not at the .05 level of significance) on tests 1-6 of the Metropolitan Readiness Test. Although this latter group of children had had no formal training it is felt that by this time the program had had an impact on the curriculum. In this same class of 1968, children in Union who had received intensive training tested significantly higher on the Metropolitan Readiness Tests 1-4 than did the children in Union with whom they had been matched.

The children receiving an enrichment program in the class of 1967 scored significantly higher (.05 level) than did the Summit Control Group on the Vocabulary Section of the Gates McGinitie Reading Test. The Summit children had been in classes of 15 and had used the ITA teaching program.

Children in Union receiving intensive training were paired (according to the same criteria used with the other groups) with Union children receiving an enrichment program. This latter group had just missed the cut-off scores and had tested, therefore, within one standard deviation above the experimental group of children. These two groups were compared on the Gates McGinitie Reading Test. Although there were no significant differences between the two groups, it might be said that the "more involved" children held their own.

As previously suggested, these tests, like any test, do have their limitations, particularly those assessing the area of gross motor orientation. Therefore, they do not reflect or measure all of the aspects of the effectiveness of such a training program. Consequently, the teachers, specialists and administrators were asked to write a statement giving their opinions of the effectiveness of the project. Their statements were positive, as were the comments often received throughout the three year study.

According to observations made by the faculty, the children are more attentive and better organized. The only negative comment was to the effect that children were kept in the program for the purpose of maintaining the experimental and control groups, whereas the children who had tested and functioned higher during the initial screening manifested a greater need for training as time progressed. However, this in itself seems to convey a positive rather than a negative assessment of the effectiveness of the program, i.e. the teachers would have liked intensive training given to any child whenever they felt it was warranted. However, because of the size of both kindergarten classes, this was not feasible.

It is interesting to note that a comparison of growth scores for each child in the program demonstrated that a large majority of children who manifested a deficient in Perceptual Motor Match (Area A) and/or in Associative Processes (Area C) improved most in those areas. Auditory Dynamics (Area B) seemed the most difficult to remediate. The staff of perception teachers expressed the opinion that improvement in Gross Motor Orientation was not adequately determined because of the limited range of the tests. Subjectively, the perception teachers noticed marked improvement in spatial orientation, body scheme, and the physical coordination of the children receiving gross motor training. It should also be pointed out that the children receiving gross motor training approached significantly higher growth scores in the areas of perceptual motor match, received significantly higher scores on the 1968 post-test of Draw-a-Man and approached a significantly higher score on the 1968 post-test of the Simkov. These results seem even more impressive when one considers the fact that the control group (which received training in all areas except gross motor) actually received more training in the area of perceptual motor match as well as in the other modalities because gross motor activities were deleted from their half hour of training.

Obviously, there appears to be a need for more refined research with respect to the purported effect of gross motor training on perceptual-motor match.

RECOMMENDATIONS

As a result of the objective data and clinical observations made in this study, the following recommendations for further research are suggested:

1. Children should be screened for developmental lags as early as possible. This could be done formally, or it can be an informal organized process by a skilled preschool, or kindergarten teacher familiar with the concept of diagnostic teaching.

2. Training should be provided for those youngsters manifesting a deficit. The emphasis should be placed on reinforcement of areas of strength with an attempt to improve deficit areas, for realistically speaking, some children may always have to depend on their strengths to compensate for their deficits.

3. In the Union program the value of gross motor-training was apparent in the child's improved body awareness and in his physical coordination. There seemed to be some indication of carry-over into visual motor match. Therefore, a dynamic physical education program is recommended for young children. This should be part of the curriculum in first grade. Activities should be varied so that children are not taught splinter skills.

4. A "whole child" approach to teaching is strongly suggested as opposed to stereotyped perceptual training skills. The teacher should teach each child as an individual. She should take into consideration his strengths, his limitations, and his needs, i.e. developmental, academic, emotional, social, and physical.

5. The manner in which the teacher instructs or corrects a child is just as important as the techniques she uses. The approach should be positive rather than critical. The youngster should be encouraged to check his own work and to correct his errors.

6. There seems to be a need for parent education relevant to pre-natal care, health education and parent-child interaction (inter-family dynamics).

IMPLICATIONS FOR FUTURE RESEARCH

1. More refined research is needed with respect to the purported relationship between specific training techniques and academic subjects. For example, after the first year of our program there was indication that gross motor training enhanced improvement in perceptual-motor match. That a positive relationship between these two modalities was not strongly substantiated during the duration of this program may be accounted for by the fact that the children not receiving training in gross motor orientation were in a sense getting more training in visual-motor match, and in the other modalities, for all experimental groups received a half hour of training per day. On the other hand, perhaps the value of gross motor training is in improving the physical coordination of the children so that they become better organized, i.e. the end result may be an "all systems go" effect.

2. There seems to be a need for a test that more adequately assesses gains in gross motor orientation. The parts of the Purdue Perceptual Motor Survey which were used, may be adequate as clinical instruments but their range is limited for quantification purposes.

3. It would be interesting to assess the effectiveness of a gross motor program in addition to the regular school curriculum by comparing a group receiving only gross motor training with one receiving no training program. Such a study should also take into consideration the Hawthorne Effect.

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